SEQUENCE LISTING

<110> Tavtigian, Sean V.
Teng, David H.F.
Simard, Jacques
Rommens, Johanna M.
Myriad Genetics, Inc.

<120> Chromosome 17p-Linked Prostate Cancer Susceptibility Gene and a Paralog and Orthologous Genes

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<151> 1998-11-06

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Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
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cgc aag gac ccg ctg cgg cac ctg cgc acg cga gag aag cgc gga ccg  144
Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
        35                  40                  45

tcg ggg tgc tcc ggc ggc cca aac acc gtg tac ctg cag gtg gtg gca  192
Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
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gcg ggt agc cgg gac tcg ggc gcc gcg ctc tac gtc ttc tcc gag ttc  240
Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
65                  70                  75                  80

aac cgg tat ctc ttc aac tgt gga gaa ggc gtt cag aga ctc atg cag  288
Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Val Gln Arg Leu Met Gln
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atg cac tgg tct aat gtt ggg ggc tta agt gga atg att ctt act tta   384
Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
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aag gaa acc ggg ctt cca aag tgt gta ctt tct gga cct cca caa ctg   432
Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
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gaa aaa tac ctc gaa gca atc aaa ata ttt tct ggt cca ttg aaa gga   480
Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
145                 150                 155                 160

ata gaa ctg gct gtg cgg ccc cac tct gcc cca gaa tac gag gat gaa   528
Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
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acc atg aca gtt tac cag atc ccc ata cac agt gaa cag agg agg gga   576
Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
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aag cac caa cca tgg cag agt cca gaa agg cct ctc agc agg ctc agt   624
Lys His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
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Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
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Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
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aga gag att ttg gct gaa gag ctg tgt act cct cca gat cct ggt gct   912
Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
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gct ttt gtg gtg gta gaa tgt cca gat gaa agc ttc att caa ccc atc   960
Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
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tgt gag aat gcc acc ttt cag agg tac caa gga aag gca gat gcc ccc  1008
Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
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Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
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att caa acc cag ctc aac ctc atc cac ccg gac atc ttc ccc ctg ctc   1200
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Trp Gln Arg Asp Ala Ile Ile Thr Cys Asn Pro Glu Glu Phe Ile Val
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Glu Ala Leu Gln Leu Pro Asn Phe Gln Gln Ser Val Gln Glu Tyr Arg
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agg agt gcg cag gac ggc cca gcc cca gca gag aaa aga agt cag tac   1440
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cta ctg gac tgt ggt gag ggc aca ttt ggg cag ctg tgc cgt cat tac   1584
Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys Arg His Tyr
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gga gac cag gtg gac agg gtc ctg ggc acc ctg gct gct gtg ttt gtg   1632
Gly Asp Gln Val Asp Arg Val Leu Gly Thr Leu Ala Ala Val Phe Val
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tcc cac ctg cac gca gat cac cac acg ggc ttg cca agt atc ttg ctg   1680
Ser His Leu His Ala Asp His His Thr Gly Leu Pro Ser Ile Leu Leu
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cag aga gaa cgc gcc ttg gca tct ttg gga aag ccg ctt cac cct ttg   1728
Gln Arg Glu Arg Ala Leu Ala Ser Leu Gly Lys Pro Leu His Pro Leu
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ctg gtg gtt gcc ccc aac cag ctc aaa gcc tgg ctc cag cag tac cac   1776
Leu Val Val Ala Pro Asn Gln Leu Lys Ala Trp Leu Gln Gln Tyr His
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aac cag tgc cag gag gtc ctg cac cac atc agt atg att cct gcc aaa   1824
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atc agt tcg ctg ttg cga aca tgt gat ttg gaa gag ttt cag acc tgt   1920
Ile Ser Ser Leu Leu Arg Thr Cys Asp Leu Glu Glu Phe Gln Thr Cys
625                 630                 635                 640

ctg gtg cgg cac tgc aag cat gcg ttt ggc tgt gcg ctg gtg cac acc   1968
Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu Val His Thr
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tct ggc tgg aaa gtg gtc tat tcc ggg gac acc atg ccc tgc gag gct   2016
Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
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ctg gtc cgg atg ggg aaa gat gcc acc ctc ctg ata cat gaa gcc acc   2064
Leu Val Arg Met Gly Lys Asp Ala Thr Leu Leu Ile His Glu Ala Thr
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ctg gaa gat ggt ttg gaa gag gaa gca gtg gaa aag aca cac agc aca   2112
Leu Glu Asp Gly Leu Glu Glu Glu Ala Val Glu Lys Thr His Ser Thr
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acg tcc caa gcc atc agc gtg ggg atg cgg atg aac gcg gag ttc att   2160
Thr Ser Gln Ala Ile Ser Val Gly Met Arg Met Asn Ala Glu Phe Ile
705                 710                 715                 720

atg ctg aac cac ttc agc cag cgc tat gcc aag gtc ccc ctc ttc agc   2208
Met Leu Asn His Phe Ser Gln Arg Tyr Ala Lys Val Pro Leu Phe Ser
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ccc aac ttc agc gag aaa gtg gga gtt gcc ttt gac cac atg aag gtc   2256
Pro Asn Phe Ser Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
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tgc ttt gga gac ttt cca aca atg ccc aag ctg att ccc cca ctg aaa   2304
Cys Phe Gly Asp Phe Pro Thr Met Pro Lys Leu Ile Pro Pro Leu Lys
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gcc ctg ttt gct ggc gac atc gag gag atg gag gag cgc agg gag aag   2352
Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Glu Glu Arg Arg Glu Lys
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cgg gag ctg cgg cag gtg cgg gcg gcc ctc ctg tcc agg gag ctg gca   2400
Arg Glu Leu Arg Gln Val Arg Ala Ala Leu Leu Ser Arg Glu Leu Ala
785                 790                 795                 800

ggc ggc ctg gag gat ggg gag cct cag cag aag cgg gcc cac aca gag   2448
Gly Gly Leu Glu Asp Gly Glu Pro Gln Gln Lys Arg Ala His Thr Glu
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Glu His Lys Leu Lys Val Ala Arg Leu Asp Asn Ile Phe Leu Thr Arg
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Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
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Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
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Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
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Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
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Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
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Lys His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
195 200 205

Pro Glu Arg Ser Ser Asp Ser Glu Ser Asn Glu Asn Glu Pro His Leu
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Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
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245 250 255

Leu Lys Ala Lys Glu Met Gly Leu Pro Val Gly Thr Ala Ala Ile Ala
260 265 270

Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
275 280 285

Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
290 295 300

Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
305 310 315 320

Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
325 330 335

Val Ala Leu Val Val His Met Ala Pro Ala Ser Val Leu Val Asp Ser
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Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr Gln His Leu
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Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
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Ile Gln Thr Gln Leu Asn Leu Ile His Pro Asp Ile Phe Pro Leu Leu
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Cys Leu Gln Glu Gly Ala Glu Ile Ser Ser Pro Ala Val Glu Arg Leu
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Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
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Pro Asn Phe Ser Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
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1925-1995; exon 4: 3025-3089; exon 5: 4361-4418;
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8186-8244; exon 9: 12878-12936; exon 10:
13032-13104;

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<223> exon 19: 23045-23154; exon 20: 23795-23895; exon 21: 23973-24093; exon 22: 24354-24432; exon 23: 25026-25170; exon 24: 25812-26036; polyadenylation signal: 26447-26452

<220>
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gctgagtgtt gagaccagga 20

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<400> 177
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<400> 179
ttgattttga gagcatctgg ac 22

<210> 180
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<400> 180
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<210> 181
<211> 37
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<400> 181
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<400> 183
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ccacacagag gagccacag 19

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<400> 186
ccagaggtgc tcactacgac 20

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aggaaacagc tatgaccatc atctgcttgc ttccgtgtg 39

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gttttcccag tcacgacgtc aggataggtg gtatggagc 39

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<400> 190
aggaaacagc tatgaccatc ggacacttag acccactgat 40

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agactccgag tygaatgaaa atg 23

<210> 192
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ggtgagggca crtttgggca gct 23

<210> 193
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gcaccctggc trctgtgttt gtg 23

<210> 194
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gtgtcccacc tgcacgcaga tca 23

<210> 195
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gtgtcccacc tggcacgcag atca 24

<210> 196
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aagccgcttc aycctttgct ggt 23

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<400> 197
gctgttgcga acrtgtgatt tgga 24

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gaggcttggg stcccacata ag 22

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cctggcacag cygcgggcca gga 23

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aatccagcaa artgattccc tgc 23

<210> 201
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<400> 201
taaatgtttt ytcattctta g 21

<210> 202
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<400> 202
ttgctgttgt gyggttttct tgt 23

<210> 203
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ggttttcttg attcagcagt taca 24

<210> 204
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<400> 204
ggttttcttg atgattcagc agttaca 27

<210> 205
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<400> 205
gtgtctcaga cyggcccctt gtc 23

<210> 206
<211> 23
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<213> Homo sapiens

<400> 206
tgccatcttg awctaatgga atc 23

<210> 207
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<213> Homo sapiens

<400> 207
cttctctctc tycctgcagg gat 23

<210> 208
<211> 23
<212> DNA
<213> Homo sapiens

<400> 208
catcaagggc aygtttactt ttt 23

<210> 209
<211> 23
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<213> Homo sapiens

<400> 209
cagccttgcc csctgggctg ttg 23

<210> 210
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<212> DNA
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<220>
<221> CDS
<222> (51)..(293)

<400> 210
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Met Trp
1

gcg ctt tgc tcg ctg ctg cgg tcc gcg gcc gga cgc acc atg tcg cag 104
Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met Ser Gln
5 10 15

gga cgc acc ata tcg cag gca ccc gcc cgc cgc gag cgg ccg cgc aag 152
Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro Arg Lys
20 25 30

gac ccg ctg cgg cac ctg cgc acg cga gag aag cgc gga ccg tcg ggg 200
Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro Ser Gly
35 40 45 50

tgc tcc ggc ggc cca aac acc gtg tac ctg cag gtg gtg gca gcg ggt 248
Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala Ala Gly
55 60 65

agc cgg gac tcg ggc gcc gcg ctc tac gtc ttc tcc gag ttc aac 293
Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe Asn
70 75 80

cggtcagtca acgagccacg ccccgtcccg ctgggccctc agtgcggcgc agcctct 350

<210> 211
<211> 81
<212> PRT
<213> Homo sapiens

<400> 211
Met Trp Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met
1 5 10 15

Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
20 25 30

Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
35 40 45

Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
50 55 60

Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
65 70 75 80

Asn

<210> 212
<211> 326
<212> DNA
<213> Mus musculus

<220>
<221> CDS
<222> (51)..(269)

<400> 212
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Met Trp
1

gcg ctc cgc tca ctg ttg cgt ccc ctt ggc ctg cgc acc atg tcg cag 104
Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met Ser Gln
5 10 15

ggt tcg gct cgt cgg ccg cgg cca ccc aag gac cca ctg cga cac ctg 152
Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg His Leu
20 25 30

cgt acg cgg gag aag cgc ggc ccg ggt ccc ggg ggc ccg aac acc gtg 200
Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn Thr Val
35 40 45 50

tac ctg cag gtg gtg gcg gcg ggc ggc cgg gac gcg ggg gct gct ctc 248
Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala Ala Leu
55 60 65

tat gtc ttc tcg gaa tac aac aggtcagagt gggccgacag ccctggggga 299
Tyr Val Phe Ser Glu Tyr Asn
70

ttggccccag cgccacgtgc tcgggag 326

<210> 213
<211> 73
<212> PRT
<213> Mus musculus

<400> 213
Met Trp Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met
1 5 10 15

Ser Gln Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg
20 25 30

His Leu Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn
35 40 45

Thr Val Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala
50 55 60

Ala Leu Tyr Val Phe Ser Glu Tyr Asn
65 70

<210> 214
<211> 13
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence:Histidine containing motif.

<220>
<221> SITE
<222> (1)..(3)
<223> These amino acids can each be any large hydrophobic residue.

<220>
<221> SITE
<222> (4)
<223> This is serine or threonine.

<220>
<221> SITE
<222> (6)
<223> This can be any amino acid residue.

<220>
<221> SITE
<222> (8)
<223> This can be any amino acid residue.

<220>
<221> SITE
<222> (11)..(12)
<223> These can be any amino acid residues.

<400> 214
Xaa Xaa Xaa Xaa His Xaa His Xaa Asp His Xaa Xaa Gly
1 5 10

<210> 215
<211> 127
<212> DNA
<213> Homo sapiens

<220>
<221> misc_feature
<222> (1)..(127)
<223> Exon 1.

<400> 215
tttaatacga ctcactatag ggaatttggc cctcgagnng aattcggcac gagggtagcc 60

ccgcgacagc tgggccgagg gtgcgggcct gcgctccctc ggctcctggc gcgggctcgg 120

ggagagg 127

<210> 216
<211> 983
<212> DNA
<213> Homo sapiens

<220>
<221> intron
<222> (1)..(300)
<223> Upstream intron of exon 2.

<220>
<221> misc_structure
<222> (301)..(465)
<223> Exon 2.

<220>
<221> intron
<222> (466)..(983)
<223> Intron downstream of exon 2.

<400> 216
gtctccatag ttttgccttt ttgagaacat catatagtta gaattcagct atagttttta 60

attgcctggg tttggttatt tttgtttgtt tgggtgtgtg aacaattata caagatttgt 120

taacttgtag ttttagccaa gttattaaaa ccttactgtg gatatgtgtg gaatactatg 180

agagaccaag aatccagact gttctaaata accaaaaagt aataatagag ataaatatta 240

caggaatatg tttttggtcc agtgatatga aataatcccc agatgatctt tctgttgcag 300

ggtggaagat gtctatggat gtgacattcc tggggacggg tgcagcatac ccatctccaa 360

cccggggtgc ctctgctgtg gtccttcggt gtgaaggcga gtgctggctc tttgactgtg 420

gggagggaac acagacacag cttatgaaaa gccaacttaa agcaggttag tgtgccttca 480

gctatctcat taagaatttt ttgttgttct gcttcatttt cttggctctc cttggacatt 540

ttgtttagaa acagccctga tggttgcatc ccacttcagt gctacaccct ggtgagactt 600

ggaaggcctg caggcatctg gccacgtcca ctgaacttca tttacttatt tacttgcttt 660

tcatttatcc tgtagatgct gaaagcaagg attcatgtag gcttggggtt tgggaaatgt 720

cgtgggatac accaggcata ttagatgaac actgccttag caaggaagca gtgtacatac 780

ttacctccac caggagatag ttttcatgag aggatgcaaa gggtaggaaa tgtttggagg 840

aggagatgtt gttttcctct tggggttatc aggtaaactt ctcagagaag ttgacctgtg 900

gattgtcaaa gagagagatt tcaggctgag agaagaaggc atttcatcag gggatggagt 960

gagcagagcc acacctggga gat 983

<210> 217
<211> 1287
<212> DNA
<213> Homo sapiens

<220>
<221> intron
<222> (1)..(300)
<223> Intron upstream of exon 3.

<220>
<221> misc_feature
<222> (301)..(768)
<223> Exon 3.

<220>
<221> intron
<222> (769)..(1287)
<223> Intron downstream of exon 3.

<400> 217
gtgagctatg atcacaccac tgcactccag cctggatgac agagcaagac ctgtctcttt 60

aaaaaaaaaa aaactattaa aaacaaacaa acaaaaaacc acctggtgaa ataaagcctg 120

tcttcttgtt tttggaatca tgtagcaaaa tgtaaatgaa taagtttatg atgataagta 180

gaacttttaa attcaattta ctatttttaa tgtaaattgt taggcttgtt tcaaatagct 240

ttgtatgggt ttttagttaa tgaaaaattt ccaaacgtat ttctctatct caatcaaaag 300

ggagaattac caagatcttc atcacacacc ttcatggaga ccatttcttt ggccttcctg 360

ggctcctctg cacaatcagc ctgcagagtg gctccatggt gtccaaacag cctattgaaa 420

tctatggccc tgtagggctt cgggacttta tctggcgaac catggaactc tctcacacgg 480

agctggtctt ccattatgtg gttcatgaac tggttcctac agcagatcaa tgtcctgcag 540

aagaactaaa agaatttgcg catgtgaata gagcagacag tcctcccaaa gaggaacaag 600

gaagaactat cctgttagac tcagaagaaa actcatacct tctgtttgat gatgaacaat 660

ttgttgtaaa agcatttcgc ctctttcaca gaattccctc atttgggttt tcagtcgtgg 720

aaaagaaacg cccaggtaaa ctcaatgcac agaaacttaa agaccttggt aagtgttttt 780

ttgttttttg ttttttcccg ccttctcatc aatagggctc ctgttgactg aagctataag 840

aaatgtcata gtaaggccag gagttgtggc tcacgcctgt aatcctagca ctttgggagg 900

ccgaggtggg aggatcactt gagttcggga gttcaagacc agcctgggca acatggcgaa 960

accccatctc tactaaaaat acaaaaagta actgggtgtg gtgtcatgtg cctgtagtcc 1020

cagctacttg gggggctgag gcaggaggat cacttgaacc tgggaggtca aggctgcagt 1080

aagccaagat agtgttacta tactccagct tgggtgacaa agcgaaactc tgtctcaaaa 1140

aaaaaaaagt gtcatagtaa gcttccactc ctctatccca ggcctgaaac tgacaatttc 1200

tcacttagtc ctttgtccaa agttgcttat taagaaatcc atggggccaa aaaaatgcta 1260

tttagagcaa acccagtata catttga 1287

<210> 218
<211> 1378
<212> DNA
<213> Homo sapiens

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<220>
<221> intron
<222> (1)..(300)
<223> Intron upstream of exon 4.

<220>
<221> misc_feature
<222> (301)..(966)
<223> Exon 4 with CDS ending at 764.

<220>
<221> intron
<222> (967)..(1378)
<223> Intron downstream of exon 4.

<400> 218
tgtgcacagc agagaatcaa gaatgttaca gtgactacaa taaggtccta gtgatactta 60

ggagactaaa acttgtctga catgtatgca tgggaaatgt ttcaagtact aaggcattgc 120

taatatcaat caacactgaa attttaaaaa tgtataaatc cagttttcca caagtagtaa 180

aacatttata acaattatgg atgccttttc cattagctat ttgcaatgct gttaaaatag 240

actcttgaaa agtcataaat tccattccta tgatgtaatg ttatctgcct tcatcattag 300

gtgttccacc aggtcctgcc tatgggaagc tgaaaaatgg aatttctgtt gttctggaaa 360

atggggttac aatttctccc caagatgtct taaaaaagcc tattgttgga agaaaaatct 420

gcatattggg tgactgctct ggggttgtgg gtgatggagg agtaaaactg tgctttgaag 480

cagacctgtt gatccacgaa gcaaccctgg atgatgccca gatggacaaa gcaaaggagc 540

atggccacag cacaccacag atggcagcaa catttgcaaa gttgtgccgt gcaaagaggc 600

tggttctgac tcacttcagt cagaggtaca aaccagttgc cttggccaga gaaggagaaa 660

cagatggcat tgcagaacta aaaaagcaag ctgaatcagt gttagatctc caagaagtga 720

ctctagcaga agattttatg gtgataagca ttccaatcaa gaaatgaaac cagtgttcct 780

gagtgcacac tgacatgtct gtgaatatgt tactgaacct atagtccagt tttttattt 840

cttgttttag tctgaaatta tttgggccct aataatccta aaaagaatgg agctgcattg 900

atgaattggc tcagtattta aagggagcaa actttttgat aataaatctt tttaagagaa 960

aaaaaaccca gcatcctttt tgaagtccag atttgtcaaa atgatagact attcagttat 1020

acatcttatt ttgtgctact accacagata gccaatattc catgcagtcc tgggcttagc 1080

ttctgcccag ctttattgct gctattggca aagagcacag gactcagccc tcgtggctaa 1140

aaatggtatt ttggcagttt gtattgaatc tgtttgtgtt attaacagaa gagggagaaa 1200

tgtcatgaga cgttggacag gcaggattga tgatagcatg accatagctt tgctggaata 1260

ctgaatgcag ggtttggcta ggtgtttatt ttaacatttt attaaacttt ctatttgggt 1320

cttaacccat ggttctcaac tggggtgaca ctgctcctct agaacaggtt gaaatatg 1378
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<210> 219
<211> 1462
<212> DNA
<213> Homo sapiens

<220>
<221> CDS
<222> (136)..(1224)

<400> 219
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ccgcgacagc tgggccgagg gtgcgggcct gcgctccctc ggctcctggc gcgggctcgg 120

ggagaggggt ggaag atg tct atg gat gtg aca ttc ctg ggg acg ggt gca 171
Met Ser Met Asp Val Thr Phe Leu Gly Thr Gly Ala
1 5 10

gca tac cca tct cca acc cgg ggt gcc tct gct gtg gtc ctt cgg tgt 219
Ala Tyr Pro Ser Pro Thr Arg Gly Ala Ser Ala Val Val Leu Arg Cys
15 20 25

gaa ggc gag tgc tgg ctc ttt gac tgt ggg gag gga aca cag aca cag 267
Glu Gly Glu Cys Trp Leu Phe Asp Cys Gly Glu Gly Thr Gln Thr Gln
30 35 40

ctt atg aaa agc caa ctt aaa gca ggg aga att acc aag atc ttc atc 315
Leu Met Lys Ser Gln Leu Lys Ala Gly Arg Ile Thr Lys Ile Phe Ile
45 50 55 60

aca cac ctt cat gga gac cat ttc ttt ggc ctt cct ggg ctc ctc tgc 363
Thr His Leu His Gly Asp His Phe Phe Gly Leu Pro Gly Leu Leu Cys
65 70 75

aca atc agc ctg cag agt ggc tcc atg gtg tcc aaa cag cct att gaa 411
Thr Ile Ser Leu Gln Ser Gly Ser Met Val Ser Lys Gln Pro Ile Glu
80 85 90

atc tat ggc cct gta ggg ctt cgg gac ttt atc tgg cga acc atg gaa 459
Ile Tyr Gly Pro Val Gly Leu Arg Asp Phe Ile Trp Arg Thr Met Glu
95 100 105

ctc tct cac acg gag ctg gtc ttc cat tat gtg gtt cat gaa ctg gtt 507
Leu Ser His Thr Glu Leu Val Phe His Tyr Val Val His Glu Leu Val
110 115 120

cct aca gca gat caa tgt cct gca gaa gaa cta aaa gaa ttt gcg cat 555
Pro Thr Ala Asp Gln Cys Pro Ala Glu Glu Leu Lys Glu Phe Ala His
125 130 135 140

gtg aat aga gca gac agt cct ccc aaa gag gaa caa gga aga act atc 603
Val Asn Arg Ala Asp Ser Pro Pro Lys Glu Glu Gln Gly Arg Thr Ile
145 150 155

ctg tta gac tca gaa gaa aac tca tac ctt ctg ttt gat gat gaa caa 651
Leu Leu Asp Ser Glu Glu Asn Ser Tyr Leu Leu Phe Asp Asp Glu Gln
160 165 170

ttt gtt gta aaa gca ttt cgc ctc ttt cac aga att ccc tca ttt ggg 699
Phe Val Val Lys Ala Phe Arg Leu Phe His Arg Ile Pro Ser Phe Gly
175 180 185

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ttt tca gtc gtg gaa aag aaa cgc cca ggt aaa ctc aat gca cag aaa   747
Phe Ser Val Val Glu Lys Lys Arg Pro Gly Lys Leu Asn Ala Gln Lys
    190                 195                 200

ctt aaa gac ctt ggt gtt cca cca ggt cct gcc tat ggg aag ctg aaa   795
Leu Lys Asp Leu Gly Val Pro Pro Gly Pro Ala Tyr Gly Lys Leu Lys
205                 210                 215                 220

aat gga att tct gtt gtt ctg gaa aat ggg gtt aca att tct ccc caa   843
Asn Gly Ile Ser Val Val Leu Glu Asn Gly Val Thr Ile Ser Pro Gln
                225                 230                 235

gat gtc tta aaa aag cct att gtt gga aga aaa atc tgc ata ttg ggt   891
Asp Val Leu Lys Lys Pro Ile Val Gly Arg Lys Ile Cys Ile Leu Gly
            240                 245                 250

gac tgc tct ggg gtt gtg ggt gat gga gga gta aaa ctg tgc ttt gaa   939
Asp Cys Ser Gly Val Val Gly Asp Gly Gly Val Lys Leu Cys Phe Glu
        255                 260                 265

gca gac ctg ttg atc cac gaa gca acc ctg gat gat gcc cag atg gac   987
Ala Asp Leu Leu Ile His Glu Ala Thr Leu Asp Asp Ala Gln Met Asp
    270                 275                 280

aaa gca aag gag cat ggc cac agc aca cca cag atg gca gca aca ttt  1035
Lys Ala Lys Glu His Gly His Ser Thr Pro Gln Met Ala Ala Thr Phe
285                 290                 295                 300

gca aag ttg tgc cgt gca aag agg ctg gtt ctg act cac ttc agt cag  1083
Ala Lys Leu Cys Arg Ala Lys Arg Leu Val Leu Thr His Phe Ser Gln
                305                 310                 315

agg tac aaa cca gtt gcc ttg gcc aga gaa gga gaa aca gat ggc att  1131
Arg Tyr Lys Pro Val Ala Leu Ala Arg Glu Gly Glu Thr Asp Gly Ile
            320                 325                 330

gca gaa cta aaa aag caa gct gaa tca gtg tta gat ctc caa gaa gtg  1179
Ala Glu Leu Lys Lys Gln Ala Glu Ser Val Leu Asp Leu Gln Glu Val
        335                 340                 345

act cta gca gaa gat ttt atg gtg ata agc att cca atc aag aaa      1224
Thr Leu Ala Glu Asp Phe Met Val Ile Ser Ile Pro Ile Lys Lys
    350                 355                 360

tgaaaccagt gttcctgagt gcacactgac atgtctgtga atatgttact gaacctatag 1284

tccagttttt ttatttcttg ttttagtctg aaattatttg ggccctaata atcctaaaaa 1344

gaatggagct gcattgatga attggctcag tatttaaagg gagcaaactt tttgataata 1404

aatcttttta agagaaaaaa aaaaaaaaga aaaaagatct ataattaagc aggggcat   1462
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<210> 220
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<212> PRT
<213> Homo sapiens

<400> 220

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Met Ser Met Asp Val Thr Phe Leu Gly Thr Gly Ala Ala Tyr Pro Ser
  1               5                  10                  15
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Pro Thr Arg Gly Ala Ser Ala Val Val Leu Arg Cys Glu Gly Glu Cys
            20                  25                  30

Trp Leu Phe Asp Cys Gly Glu Gly Thr Gln Thr Gln Leu Met Lys Ser
        35                  40                  45

Gln Leu Lys Ala Gly Arg Ile Thr Lys Ile Phe Ile Thr His Leu His
    50                  55                  60

Gly Asp His Phe Phe Gly Leu Pro Gly Leu Leu Cys Thr Ile Ser Leu
65                  70                  75                  80

Gln Ser Gly Ser Met Val Ser Lys Gln Pro Ile Glu Ile Tyr Gly Pro
                85                  90                  95

Val Gly Leu Arg Asp Phe Ile Trp Arg Thr Met Glu Leu Ser His Thr
            100                 105                 110

Glu Leu Val Phe His Tyr Val Val His Glu Leu Val Pro Thr Ala Asp
        115                 120                 125

Gln Cys Pro Ala Glu Glu Leu Lys Glu Phe Ala His Val Asn Arg Ala
    130                 135                 140

Asp Ser Pro Pro Lys Glu Glu Gln Gly Arg Thr Ile Leu Leu Asp Ser
145                 150                 155                 160

Glu Glu Asn Ser Tyr Leu Leu Phe Asp Asp Glu Gln Phe Val Val Lys
                165                 170                 175

Ala Phe Arg Leu Phe His Arg Ile Pro Ser Phe Gly Phe Ser Val Val
            180                 185                 190

Glu Lys Lys Arg Pro Gly Lys Leu Asn Ala Gln Lys Leu Lys Asp Leu
        195                 200                 205

Gly Val Pro Pro Gly Pro Ala Tyr Gly Lys Leu Lys Asn Gly Ile Ser
    210                 215                 220

Val Val Leu Glu Asn Gly Val Thr Ile Ser Pro Gln Asp Val Leu Lys
225                 230                 235                 240

Lys Pro Ile Val Gly Arg Lys Ile Cys Ile Leu Gly Asp Cys Ser Gly
                245                 250                 255

Val Val Gly Asp Gly Gly Val Lys Leu Cys Phe Glu Ala Asp Leu Leu
            260                 265                 270

Ile His Glu Ala Thr Leu Asp Asp Ala Gln Met Asp Lys Ala Lys Glu
        275                 280                 285

His Gly His Ser Thr Pro Gln Met Ala Ala Thr Phe Ala Lys Leu Cys
    290                 295                 300

Arg Ala Lys Arg Leu Val Leu Thr His Phe Ser Gln Arg Tyr Lys Pro
305                 310                 315                 320

Val Ala Leu Ala Arg Glu Gly Glu Thr Asp Gly Ile Ala Glu Leu Lys
                325                 330                 335

Lys Gln Ala Glu Ser Val Leu Asp Leu Gln Glu Val Thr Leu Ala Glu
            340                 345                 350
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Asp Phe Met Val Ile Ser Ile Pro Ile Lys Lys
355 360

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<211> 2470
<212> DNA
<213> Mus musculus

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<222> (1)..(2466)

<400> 221
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Met Trp Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met
1 5 10 15

tcg cag ggt tcg gct cgt cgg ccg cgg cca ccc aaa gac cca ctg cga 96
Ser Gln Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg
20 25 30

cac ctg cgt acg cgg gag aag cgc ggc ccg ggt ccc ggg ggc ccg aac 144
His Leu Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn
35 40 45

acc gtg tac ctg cag gtg gtg gcg gcg ggc ggc cgg gac gcg ggg gct 192
Thr Val Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala
50 55 60

gct ctc tat gtc ttc tcg gaa tac aac agg tac ctt ttt aac tgc gga 240
Ala Leu Tyr Val Phe Ser Glu Tyr Asn Arg Tyr Leu Phe Asn Cys Gly
65 70 75 80

gaa ggc gtc caa cga ctt atg cag gaa cac aag act gaa agt cgc tcg 288
Glu Gly Val Gln Arg Leu Met Gln Glu His Lys Thr Glu Ser Arg Ser
85 90 95

ctt gac aac atc ttt ctg act cgg atg cat tgg tca aat gtt ggg ggg 336
Leu Asp Asn Ile Phe Leu Thr Arg Met His Trp Ser Asn Val Gly Gly
100 105 110

ttg tgt gga atg att tta act tta aag gaa acc ggg ctt ccc aaa tgt 384
Leu Cys Gly Met Ile Leu Thr Leu Lys Glu Thr Gly Leu Pro Lys Cys
115 120 125

gtt ctg tct gga cca cca cag ctg gag aaa tat cta gaa gca atc aaa 432
Val Leu Ser Gly Pro Pro Gln Leu Glu Lys Tyr Leu Glu Ala Ile Lys
130 135 140

ata ttt tct ggt cca ttg aaa gga ata gaa ctg gcc gtg cgg cct cac 480
Ile Phe Ser Gly Pro Leu Lys Gly Ile Glu Leu Ala Val Arg Pro His
145 150 155 160

tct gca cca gaa tac aag gat gag acc atg act gtt tac cag gtc cct 528
Ser Ala Pro Glu Tyr Lys Asp Glu Thr Met Thr Val Tyr Gln Val Pro
165 170 175

atc cac agt gaa cgg agg tgt gga aag caa cag cca tcc cag agc ccc 576
Ile His Ser Glu Arg Arg Cys Gly Lys Gln Gln Pro Ser Gln Ser Pro
180 185 190

```
aga aca tct ccc aac agg ctc agt ccc aaa cag tca tcg gac tct gga    624
Arg Thr Ser Pro Asn Arg Leu Ser Pro Lys Gln Ser Ser Asp Ser Gly
        195                 200                 205

tca gct gaa aat ggg cag tgc caa cag gaa agc atg ggg cag gga ccc    672
Ser Ala Glu Asn Gly Gln Cys Gln Gln Glu Ser Met Gly Gln Gly Pro
    210                 215                 220

tcc tta gtg gta gct ttt gtc tgc aag ctt cac ttg agg aaa gga aac    720
Ser Leu Val Val Ala Phe Val Cys Lys Leu His Leu Arg Lys Gly Asn
225                 230                 235                 240

ttc ttg gtg ctt aaa gca aag gag ctg ggc ctt cct gtt ggg acg gcc    768
Phe Leu Val Leu Lys Ala Lys Glu Leu Gly Leu Pro Val Gly Thr Ala
                245                 250                 255

gcc att gca ccc atc att gct gct gtc aag gac ggg aag agt atc act    816
Ala Ile Ala Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr
            260                 265                 270

tac gaa gga aga gag att gct gct gaa gag ctt tgt aca ccc cca gat    864
Tyr Glu Gly Arg Glu Ile Ala Ala Glu Glu Leu Cys Thr Pro Pro Asp
        275                 280                 285

cct ggt ctt gta ttc atc gtg gta gag tgt cct gat gaa gga ttc atc    912
Pro Gly Leu Val Phe Ile Val Val Glu Cys Pro Asp Glu Gly Phe Ile
    290                 295                 300

ctg ccc atc tgt gag aac gac acc ttt aaa agg tac cag gca gag gct    960
Leu Pro Ile Cys Glu Asn Asp Thr Phe Lys Arg Tyr Gln Ala Glu Ala
305                 310                 315                 320

gat gca cct gtg gcg ctg gtg gtc cac ata gcc cca gaa tct gta ctc    1008
Asp Ala Pro Val Ala Leu Val Val His Ile Ala Pro Glu Ser Val Leu
                325                 330                 335

atc gac agc aga tac cag cag tgg atg gag agg ttc ggg cct gac aca    1056
Ile Asp Ser Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr
            340                 345                 350

cag cac ctg att ctg aat gag aat tgc ccc tcg gtc cac aac ctg cgc    1104
Gln His Leu Ile Leu Asn Glu Asn Cys Pro Ser Val His Asn Leu Arg
        355                 360                 365

agc cac aag att cag acc cag ctc agc ctc atc cac cct gac atc ttc    1152
Ser His Lys Ile Gln Thr Gln Leu Ser Leu Ile His Pro Asp Ile Phe
    370                 375                 380

ccc cag ctt acc agc ttc tat agt aag gag gaa ggg tcc acc ctc agc    1200
Pro Gln Leu Thr Ser Phe Tyr Ser Lys Glu Glu Gly Ser Thr Leu Ser
385                 390                 395                 400

gtg cca aca gtt cgg ggt gaa tgc ctc ctc aag tat tca gtc cgc ccc    1248
Val Pro Thr Val Arg Gly Glu Cys Leu Leu Lys Tyr Ser Val Arg Pro
                405                 410                 415

aag aga gag tgg cag agg gat acc aca ctc gac tgc aat act gat gaa    1296
Lys Arg Glu Trp Gln Arg Asp Thr Thr Leu Asp Cys Asn Thr Asp Glu
            420                 425                 430

ttc ata gct gag gcc ttg gag ctc ccc agt ttc cag gag agt gtg gag    1344
Phe Ile Ala Glu Ala Leu Glu Leu Pro Ser Phe Gln Glu Ser Val Glu
        435                 440                 445
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gag tat cgg aag aac gtg cag gaa aac cca gcc cca gca gag aaa aga    1392
Glu Tyr Arg Lys Asn Val Gln Glu Asn Pro Ala Pro Ala Glu Lys Arg
    450                 455                 460

agc cag tat cct gaa att gtc ttc ctg ggt acg ggg tct gcc atc cca    1440
Ser Gln Tyr Pro Glu Ile Val Phe Leu Gly Thr Gly Ser Ala Ile Pro
465                 470                 475                 480

atg gag atc cga aat gtc agt tcc aca ctc gtc aac cta agc cct gac    1488
Met Glu Ile Arg Asn Val Ser Ser Thr Leu Val Asn Leu Ser Pro Asp
                485                 490                 495

aag tca gtg ctc ctg gat tgt gga gaa ggc act ttt ggg cag ttg tgc    1536
Lys Ser Val Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys
            500                 505                 510

cgt cat tac gga cag caa ata gac cga gtc tta tgc agc ctc acg gct    1584
Arg His Tyr Gly Gln Gln Ile Asp Arg Val Leu Cys Ser Leu Thr Ala
        515                 520                 525

gtg ttt gtg tcc cac ctg cac gcc gac cac cac acg ggc ttg ctg aat    1632
Val Phe Val Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn
    530                 535                 540

atc ttg ctg cag aga gag cat gcg ttg gca tct ctg ggg aaa ccc ttc    1680
Ile Leu Leu Gln Arg Glu His Ala Leu Ala Ser Leu Gly Lys Pro Phe
545                 550                 555                 560

cag ccc ttg ctt gtg gtg gct cct acc cag ctc agg gcc tgg ctg cag    1728
Gln Pro Leu Leu Val Val Ala Pro Thr Gln Leu Arg Ala Trp Leu Gln
                565                 570                 575

cag tat cac aac cac tgc cag gag att ctg cac cac gtc agt atg att    1776
Gln Tyr His Asn His Cys Gln Glu Ile Leu His His Val Ser Met Ile
            580                 585                 590

cct gcc aaa tgc ctt cag aaa ggg gca gag gtc tcc aat act aca ttg    1824
Pro Ala Lys Cys Leu Gln Lys Gly Ala Glu Val Ser Asn Thr Thr Leu
        595                 600                 605

gaa agg ctg ata agc ttg ctg ttg gaa aca tgt gac tta gaa gaa ttt    1872
Glu Arg Leu Ile Ser Leu Leu Leu Glu Thr Cys Asp Leu Glu Glu Phe
    610                 615                 620

cag acc tgc ctg gta cgg cac tgc aag cat gct ttt ggc tgt gca ctg    1920
Gln Thr Cys Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu
625                 630                 635                 640

gta cat tca tct ggc tgg aaa gtc gtc tac tcg ggg gat acc atg ccc    1968
Val His Ser Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro
                645                 650                 655

tgt gag gct ctg gtc cag atg ggg aaa gat gcc acc ctc ctg ata cat    2016
Cys Glu Ala Leu Val Gln Met Gly Lys Asp Ala Thr Leu Leu Ile His
            660                 665                 670

gaa gcc act ctg gag gat cnc ttg gaa gag gaa gca gta gag agg aca    2064
Glu Ala Thr Leu Glu Asp Xaa Leu Glu Glu Glu Ala Val Glu Arg Thr
        675                 680                 685

cac agc acc acc tcc cag gct att aat gtg ggg atg cgg atg aat gcg    2112
His Ser Thr Thr Ser Gln Ala Ile Asn Val Gly Met Arg Met Asn Ala
    690                 695                 700
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gag ttc atc atg ctg aac cac ttc agt cag cgg tac gcn aag atc ccc   2160
Glu Phe Ile Met Leu Asn His Phe Ser Gln Arg Tyr Xaa Lys Ile Pro
705                 710                 715                 720

ctt ttc agc cct gac ttc aac gag aaa gtt ggc atc gcc ttt gac cac   2208
Leu Phe Ser Pro Asp Phe Asn Glu Lys Val Gly Ile Ala Phe Asp His
                725                 730                 735

atg aag gtc tgn ttt gga gac ttc ccg aca gtg ccc aag ctg att ccc   2256
Met Lys Val Xaa Phe Gly Asp Phe Pro Thr Val Pro Lys Leu Ile Pro
            740                 745                 750

cca ctg aag gcc ctg ttt gca ggt gac att gaa gag atg gtg gaa cgc   2304
Pro Leu Lys Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Val Glu Arg
        755                 760                 765

agg gag aag agg gag cta cgg ctg gtg cga gca gcc ctc ctg acc cag   2352
Arg Glu Lys Arg Glu Leu Arg Leu Val Arg Ala Ala Leu Leu Thr Gln
    770                 775                 780

cag gca gac agc cca gag gac aga gaa ccc caa cag aag cgg gcc cac   2400
Gln Ala Asp Ser Pro Glu Asp Arg Glu Pro Gln Gln Lys Arg Ala His
785                 790                 795                 800

aca gat gaa cca cac agc cca cag agc aag aag gag agc gtg gca aac   2448
Thr Asp Glu Pro His Ser Pro Gln Ser Lys Lys Glu Ser Val Ala Asn
                805                 810                 815

act tta gga gcg cga gtg tgag                                     2470
Thr Leu Gly Ala Arg Val
            820
```

<210> 222
<211> 822
<212> PRT
<213> Mus musculus

<400> 222

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Met Trp Ala Leu Arg Ser Leu Leu Arg Pro Leu Gly Leu Arg Thr Met
  1               5                  10                  15

Ser Gln Gly Ser Ala Arg Arg Pro Arg Pro Pro Lys Asp Pro Leu Arg
            20                  25                  30

His Leu Arg Thr Arg Glu Lys Arg Gly Pro Gly Pro Gly Gly Pro Asn
        35                  40                  45

Thr Val Tyr Leu Gln Val Val Ala Ala Gly Gly Arg Asp Ala Gly Ala
    50                  55                  60

Ala Leu Tyr Val Phe Ser Glu Tyr Asn Arg Tyr Leu Phe Asn Cys Gly
65                  70                  75                  80

Glu Gly Val Gln Arg Leu Met Gln Glu His Lys Thr Glu Ser Arg Ser
                85                  90                  95

Leu Asp Asn Ile Phe Leu Thr Arg Met His Trp Ser Asn Val Gly Gly
            100                 105                 110

Leu Cys Gly Met Ile Leu Thr Leu Lys Glu Thr Gly Leu Pro Lys Cys
        115                 120                 125
```

```
Val Leu Ser Gly Pro Pro Gln Leu Glu Lys Tyr Leu Glu Ala Ile Lys
    130                 135                 140

Ile Phe Ser Gly Pro Leu Lys Gly Ile Glu Leu Ala Val Arg Pro His
145                 150                 155                 160

Ser Ala Pro Glu Tyr Lys Asp Glu Thr Met Thr Val Tyr Gln Val Pro
                165                 170                 175

Ile His Ser Glu Arg Arg Cys Gly Lys Gln Gln Pro Ser Gln Ser Pro
            180                 185                 190

Arg Thr Ser Pro Asn Arg Leu Ser Pro Lys Gln Ser Ser Asp Ser Gly
        195                 200                 205

Ser Ala Glu Asn Gly Gln Cys Gln Gln Glu Ser Met Gly Gln Gly Pro
    210                 215                 220

Ser Leu Val Val Ala Phe Val Cys Lys Leu His Leu Arg Lys Gly Asn
225                 230                 235                 240

Phe Leu Val Leu Lys Ala Lys Glu Leu Gly Leu Pro Val Gly Thr Ala
                245                 250                 255

Ala Ile Ala Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr
            260                 265                 270

Tyr Glu Gly Arg Glu Ile Ala Ala Glu Glu Leu Cys Thr Pro Pro Asp
        275                 280                 285

Pro Gly Leu Val Phe Ile Val Val Glu Cys Pro Asp Glu Gly Phe Ile
    290                 295                 300

Leu Pro Ile Cys Glu Asn Asp Thr Phe Lys Arg Tyr Gln Ala Glu Ala
305                 310                 315                 320

Asp Ala Pro Val Ala Leu Val Val His Ile Ala Pro Glu Ser Val Leu
                325                 330                 335

Ile Asp Ser Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr
            340                 345                 350

Gln His Leu Ile Leu Asn Glu Asn Cys Pro Ser Val His Asn Leu Arg
        355                 360                 365

Ser His Lys Ile Gln Thr Gln Leu Ser Leu Ile His Pro Asp Ile Phe
    370                 375                 380

Pro Gln Leu Thr Ser Phe Tyr Ser Lys Glu Glu Gly Ser Thr Leu Ser
385                 390                 395                 400

Val Pro Thr Val Arg Gly Glu Cys Leu Leu Lys Tyr Ser Val Arg Pro
                405                 410                 415

Lys Arg Glu Trp Gln Arg Asp Thr Thr Leu Asp Cys Asn Thr Asp Glu
            420                 425                 430

Phe Ile Ala Glu Ala Leu Glu Leu Pro Ser Phe Gln Glu Ser Val Glu
        435                 440                 445

Glu Tyr Arg Lys Asn Val Gln Glu Asn Pro Ala Pro Ala Glu Lys Arg
    450                 455                 460
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Ser Gln Tyr Pro Glu Ile Val Phe Leu Gly Thr Gly Ser Ala Ile Pro
465                 470                 475                 480

Met Glu Ile Arg Asn Val Ser Ser Thr Leu Val Asn Leu Ser Pro Asp
                485                 490                 495

Lys Ser Val Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys
            500                 505                 510

Arg His Tyr Gly Gln Gln Ile Asp Arg Val Leu Cys Ser Leu Thr Ala
        515                 520                 525

Val Phe Val Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn
    530                 535                 540

Ile Leu Leu Gln Arg Glu His Ala Leu Ala Ser Leu Gly Lys Pro Phe
545                 550                 555                 560

Gln Pro Leu Leu Val Val Ala Pro Thr Gln Leu Arg Ala Trp Leu Gln
                565                 570                 575

Gln Tyr His Asn His Cys Gln Glu Ile Leu His His Val Ser Met Ile
            580                 585                 590

Pro Ala Lys Cys Leu Gln Lys Gly Ala Glu Val Ser Asn Thr Thr Leu
        595                 600                 605

Glu Arg Leu Ile Ser Leu Leu Leu Glu Thr Cys Asp Leu Glu Glu Phe
    610                 615                 620

Gln Thr Cys Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu
625                 630                 635                 640

Val His Ser Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro
                645                 650                 655

Cys Glu Ala Leu Val Gln Met Gly Lys Asp Ala Thr Leu Leu Ile His
            660                 665                 670

Glu Ala Thr Leu Glu Asp Xaa Leu Glu Glu Glu Ala Val Glu Arg Thr
        675                 680                 685

His Ser Thr Thr Ser Gln Ala Ile Asn Val Gly Met Arg Met Asn Ala
    690                 695                 700

Glu Phe Ile Met Leu Asn His Phe Ser Gln Arg Tyr Xaa Lys Ile Pro
705                 710                 715                 720

Leu Phe Ser Pro Asp Phe Asn Glu Lys Val Gly Ile Ala Phe Asp His
                725                 730                 735

Met Lys Val Xaa Phe Gly Asp Phe Pro Thr Val Pro Lys Leu Ile Pro
            740                 745                 750

Pro Leu Lys Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Val Glu Arg
        755                 760                 765

Arg Glu Lys Arg Glu Leu Arg Leu Val Arg Ala Ala Leu Leu Thr Gln
    770                 775                 780

Gln Ala Asp Ser Pro Glu Asp Arg Glu Pro Gln Gln Lys Arg Ala His
785                 790                 795                 800
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Thr Asp Glu Pro His Ser Pro Gln Ser Lys Lys Glu Ser Val Ala Asn
805 810 815

Thr Leu Gly Ala Arg Val
820

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<213> Pan troglodytes

<220>
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<222> (1)..(2478)

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Met Trp Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met
1 5 10 15

tcg cag gga cgc acc ata tcg cag gca ccc gcc cgc cgc gag cgg ccg 96
Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
20 25 30

cgc aag gac ccg ctg cgg cac ctg cgc acg cga gag aag cgc gga ccg 144
Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
35 40 45

tcg ggg tgc tcc ggc ggc cca aac acc gtg tac ctg cag gtg gtg gca 192
Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
50 55 60

gcg ggt agc cgg gac tcg ggc gcc gcg ctc tac gtc ttc tcc gag ttc 240
Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
65 70 75 80

aac cgg tat ctc ttc aac tgt gga gaa ggc att cag aga ctc atg cag 288
Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Ile Gln Arg Leu Met Gln
85 90 95

gag cac aag tta aag gtt gct cgc ctg gac aac ata ttc ctg aca cga 336
Glu His Lys Leu Lys Val Ala Arg Leu Asp Asn Ile Phe Leu Thr Arg
100 105 110

atg cac tgg tct aat gtt ggg ggc tta agt gga atg att ctt act tta 384
Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
115 120 125

aag gaa acc ggg ctt cca aag tgt gta ctt tct gga cct cca caa ctg 432
Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
130 135 140

gaa aaa tac ctc gaa gca atc aaa ata ttt tct ggt cca ttg aaa gga 480
Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
145 150 155 160

ata gaa ctg gct gtg cgg ccc cac tct gcc cca gaa tac gag gat gaa 528
Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
165 170 175

acc atg aca gtt tac cag atc ccc ata cac agt gaa cag agg agg gga 576
Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
180 185 190

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aag cac caa cca tgg cag agt cca gaa agg cct ctc agc agg ctc agt     624
Lys His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
        195                 200                 205

cca gag cga tct tca gac tcc gag tca aat gaa aat gag cca cac ctt     672
Pro Glu Arg Ser Ser Asp Ser Glu Ser Asn Glu Asn Glu Pro His Leu
    210                 215                 220

cca cat ggt gtt agc cag aga aga ggg gtc agg gac tct tcc ctg gtc     720
Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
225                 230                 235                 240

gta gct ttc atc tgt aag ctt cac tta aag aga gga aac ttc ttg gtg     768
Val Ala Phe Ile Cys Lys Leu His Leu Lys Arg Gly Asn Phe Leu Val
                245                 250                 255

ctc aaa gca aag gag atg ggc ctc cca gtt ggg aca gct gcc atc gct     816
Leu Lys Ala Lys Glu Met Gly Leu Pro Val Gly Thr Ala Ala Ile Ala
            260                 265                 270

ccc atc att gct gct gtc aag gac ggg aaa agc atc act cat gaa gga     864
Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
        275                 280                 285

aga gag att ttg gct gaa gag ctg tgt act cct cca gat cct ggt gct     912
Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
    290                 295                 300

gct ttt gtg gtg gta gaa tgt cca gat gaa agc ttc att caa ccc atc     960
Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
305                 310                 315                 320

tgt gag aat gcc acc ttt cag agg tac caa gga aag gca gat gcc ccc    1008
Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
                325                 330                 335

gtg gcc ttg gtg gtt cac atg gcc cca gaa tct gtg ctt gtg gac agc    1056
Val Ala Leu Val Val His Met Ala Pro Glu Ser Val Leu Val Asp Ser
            340                 345                 350

agg tac cag cag tgg atg gag agg ttt ggg cct gac acc cag cac ttg    1104
Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr Gln His Leu
        355                 360                 365

gtc ctg aat gag aac tgt gcc tca gtt cac aac ctt cgc agc cac aag    1152
Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
    370                 375                 380

att caa acc cag ctc aac ctc atc cac ccg gac atc ttc ccc ctg ctc    1200
Ile Gln Thr Gln Leu Asn Leu Ile His Pro Asp Ile Phe Pro Leu Leu
385                 390                 395                 400

acc agt ttc ccc tgt aag aag gag ggc ccc acc ctc agt gtg ccc atg    1248
Thr Ser Phe Pro Cys Lys Lys Glu Gly Pro Thr Leu Ser Val Pro Met
                405                 410                 415

gtt cag ggt gaa tgc ctc ctc aag tac cag ctc cgt ccc agg agg gag    1296
Val Gln Gly Glu Cys Leu Leu Lys Tyr Gln Leu Arg Pro Arg Arg Glu
            420                 425                 430

tgg cag agg gat gcc att att act tgc aat cct gag gaa ttc ata att    1344
Trp Gln Arg Asp Ala Ile Ile Thr Cys Asn Pro Glu Glu Phe Ile Ile
        435                 440                 445
```

```
gag gcg ctg cag ctt ccc aac ttc cag cag agt gtg cag gag tac agg    1392
Glu Ala Leu Gln Leu Pro Asn Phe Gln Gln Ser Val Gln Glu Tyr Arg
    450                 455                 460

agg agt gcg cag gac ggc cca gcc cca gca gag aaa aga agt cag tac    1440
Arg Ser Ala Gln Asp Gly Pro Ala Pro Ala Glu Lys Arg Ser Gln Tyr
465                 470                 475                 480

cca gaa atc atc ttc ctt gga aca ggg tct gcc atc ccg atg aag att    1488
Pro Glu Ile Ile Phe Leu Gly Thr Gly Ser Ala Ile Pro Met Lys Ile
                485                 490                 495

cga aat gtc agt gcc aca ctt gtc aac ata agc ccc gac acg tct ctg    1536
Arg Asn Val Ser Ala Thr Leu Val Asn Ile Ser Pro Asp Thr Ser Leu
            500                 505                 510

cta ctg gac tgt ggt gag ggc acg ttt ggg cag ctg tgc cgt cat tac    1584
Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys Arg His Tyr
        515                 520                 525

gga gac cag gtg gac agg gtc ctg ggc acc ctg gct gct gtg ttt gtg    1632
Gly Asp Gln Val Asp Arg Val Leu Gly Thr Leu Ala Ala Val Phe Val
    530                 535                 540

tcc cac ctg cac gca gat cac cac acg ggc ttg cta aat atc ttg ctg    1680
Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn Ile Leu Leu
545                 550                 555                 560

cag aga gaa cga gcc ttg gca tct ttg gga aag ccc ttt cac cct ttg    1728
Gln Arg Glu Arg Ala Leu Ala Ser Leu Gly Lys Pro Phe His Pro Leu
                565                 570                 575

ctg gtg gtt gcc ccc aac cag ctc aaa gcc tgg ctc cag cag tac cac    1776
Leu Val Val Ala Pro Asn Gln Leu Lys Ala Trp Leu Gln Gln Tyr His
            580                 585                 590

aac cag tgc cag gag gtc ctg cac cac atc agt atg att cct gcc aaa    1824
Asn Gln Cys Gln Glu Val Leu His His Ile Ser Met Ile Pro Ala Lys
        595                 600                 605

tgc ctt cag gaa ggg gct gag atc tcc agt cct gca gtg gaa aga ttg    1872
Cys Leu Gln Glu Gly Ala Glu Ile Ser Ser Pro Ala Val Glu Arg Leu
    610                 615                 620

atc agt tcg ctg ttg cga aca tgt gat ttg gaa gag ttt cag acc tgt    1920
Ile Ser Ser Leu Leu Arg Thr Cys Asp Leu Glu Glu Phe Gln Thr Cys
625                 630                 635                 640

ctg gtg cgg cac tgc aag cat gcg ttt ggc tgt gcg ctg gtg cac acc    1968
Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu Val His Thr
                645                 650                 655

tct ggc tgg aaa gtg gtc tat tcc ggg gac acc atg ccc tgc gag gct    2016
Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
            660                 665                 670

ctg gtc cgg atg ggg aaa gat gcc acc ctc ctg ata cat gaa gcc acc    2064
Leu Val Arg Met Gly Lys Asp Ala Thr Leu Leu Ile His Glu Ala Thr
        675                 680                 685

ctg gaa gac ggt ttg gaa gag gaa gca gtg gaa aag aca cac agc aca    2112
Leu Glu Asp Gly Leu Glu Glu Glu Ala Val Glu Lys Thr His Ser Thr
    690                 695                 700
```

```
acg tcc caa gcc atc agc gtg ggg atg cgg atg aac gcg gag ttc att   2160
Thr Ser Gln Ala Ile Ser Val Gly Met Arg Met Asn Ala Glu Phe Ile
705                 710                 715                 720

atg ctg aac cac ttc agc cag cgc tat gcc aag gtc ccc ctc ttc agc   2208
Met Leu Asn His Phe Ser Gln Arg Tyr Ala Lys Val Pro Leu Phe Ser
                725                 730                 735

ccc aac ttc aac gag aaa gtg gga gtt gcc ttt gac cac atg aag gtc   2256
Pro Asn Phe Asn Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
            740                 745                 750

tgc ttt gga gac ttt gca aca atg ccc aag ctg att ccc cca ctg aaa   2304
Cys Phe Gly Asp Phe Ala Thr Met Pro Lys Leu Ile Pro Pro Leu Lys
        755                 760                 765

gcc ctg ttt gct ggc gac atc gag gag atg gag gag cgc agg gag aag   2352
Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Glu Glu Arg Arg Glu Lys
    770                 775                 780

cgg gag ctg cgg cag gtg cgg gcg gcc ctc ctg tcc agg gag ctg gca   2400
Arg Glu Leu Arg Gln Val Arg Ala Ala Leu Leu Ser Arg Glu Leu Ala
785                 790                 795                 800

ggc ggc ctg gag gat ggg gag cct cag cag aaa cgg gcc cac aca gag   2448
Gly Gly Leu Glu Asp Gly Glu Pro Gln Gln Lys Arg Ala His Thr Glu
                805                 810                 815

gag cca cag gcc aag aag gtc aga gcc cag tgaagatctg ggagaccctg     2498
Glu Pro Gln Ala Lys Lys Val Arg Ala Gln
            820                 825

aattcagaag gctgtgtgtc ttctgcccca cgcacgcacc cgtatctgcc ctccttgctg 2558

gtagaagctg aagagcacgg tcccccagga ggcagctcag gataggtggt atggagctgt 2618

gccaaggctt gggctcccac ataagcacta gtctatagat gcctcttagg actggtgcct 2678

ggcacagccg cgggacagga ggctgccaca cggaagcaag cagatgaact aatttcattt 2738

caaggcagtt tttaaagaag gcttggaaac agacggcagc acctttcctc taatccagca 2798

aagtgattcc ctgcacacca gagacaagca gagtaacagg atcagtgggt ctaagtgtcc 2858

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<212> PRT
<213> Pan troglodytes

<400> 224

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Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
            20                  25                  30

Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
        35                  40                  45
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Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
     50                  55                  60

Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
 65                  70                  75                  80

Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Ile Gln Arg Leu Met Gln
                 85                  90                  95

Glu His Lys Leu Lys Val Ala Arg Leu Asp Asn Ile Phe Leu Thr Arg
            100                 105                 110

Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
        115                 120                 125

Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
    130                 135                 140

Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
145                 150                 155                 160

Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
                165                 170                 175

Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
            180                 185                 190

Lys His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
        195                 200                 205

Pro Glu Arg Ser Ser Asp Ser Glu Ser Asn Glu Asn Glu Pro His Leu
    210                 215                 220

Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
225                 230                 235                 240

Val Ala Phe Ile Cys Lys Leu His Leu Lys Arg Gly Asn Phe Leu Val
                245                 250                 255

Leu Lys Ala Lys Glu Met Gly Leu Pro Val Gly Thr Ala Ala Ile Ala
            260                 265                 270

Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
        275                 280                 285

Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
    290                 295                 300

Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
305                 310                 315                 320

Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
                325                 330                 335

Val Ala Leu Val Val His Met Ala Pro Glu Ser Val Leu Val Asp Ser
            340                 345                 350

Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr Gln His Leu
        355                 360                 365

Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
    370                 375                 380
```

Ile Gln Thr Gln Leu Asn Leu Ile His Pro Asp Ile Phe Pro Leu Leu
385 390 395 400

Thr Ser Phe Pro Cys Lys Lys Glu Gly Pro Thr Leu Ser Val Pro Met
405 410 415

Val Gln Gly Glu Cys Leu Leu Lys Tyr Gln Leu Arg Pro Arg Arg Glu
420 425 430

Trp Gln Arg Asp Ala Ile Ile Thr Cys Asn Pro Glu Glu Phe Ile Ile
435 440 445

Glu Ala Leu Gln Leu Pro Asn Phe Gln Gln Ser Val Gln Glu Tyr Arg
450 455 460

Arg Ser Ala Gln Asp Gly Pro Ala Pro Ala Glu Lys Arg Ser Gln Tyr
465 470 475 480

Pro Glu Ile Ile Phe Leu Gly Thr Gly Ser Ala Ile Pro Met Lys Ile
485 490 495

Arg Asn Val Ser Ala Thr Leu Val Asn Ile Ser Pro Asp Thr Ser Leu
500 505 510

Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys Arg His Tyr
515 520 525

Gly Asp Gln Val Asp Arg Val Leu Gly Thr Leu Ala Ala Val Phe Val
530 535 540

Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn Ile Leu Leu
545 550 555 560

Gln Arg Glu Arg Ala Leu Ala Ser Leu Gly Lys Pro Phe His Pro Leu
565 570 575

Leu Val Val Ala Pro Asn Gln Leu Lys Ala Trp Leu Gln Gln Tyr His
580 585 590

Asn Gln Cys Gln Glu Val Leu His His Ile Ser Met Ile Pro Ala Lys
595 600 605

Cys Leu Gln Glu Gly Ala Glu Ile Ser Ser Pro Ala Val Glu Arg Leu
610 615 620

Ile Ser Ser Leu Leu Arg Thr Cys Asp Leu Glu Glu Phe Gln Thr Cys
625 630 635 640

Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu Val His Thr
645 650 655

Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
660 665 670

Leu Val Arg Met Gly Lys Asp Ala Thr Leu Leu Ile His Glu Ala Thr
675 680 685

Leu Glu Asp Gly Leu Glu Glu Glu Ala Val Glu Lys Thr His Ser Thr
690 695 700

Thr Ser Gln Ala Ile Ser Val Gly Met Arg Met Asn Ala Glu Phe Ile
705 710 715 720

Met Leu Asn His Phe Ser Gln Arg Tyr Ala Lys Val Pro Leu Phe Ser
725 730 735

Pro Asn Phe Asn Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
740 745 750

Cys Phe Gly Asp Phe Ala Thr Met Pro Lys Leu Ile Pro Pro Leu Lys
755 760 765

Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Glu Glu Arg Arg Glu Lys
770 775 780

Arg Glu Leu Arg Gln Val Arg Ala Ala Leu Leu Ser Arg Glu Leu Ala
785 790 795 800

Gly Gly Leu Glu Asp Gly Glu Pro Gln Gln Lys Arg Ala His Thr Glu
805 810 815

Glu Pro Gln Ala Lys Lys Val Arg Ala Gln
820 825

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<211> 2892
<212> DNA
<213> Gorilla gorilla

<220>
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<222> (1)..(2478)

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Met Trp Ala Leu Cys Ser Leu Leu Arg Ser Ala Ala Gly Arg Thr Met
1 5 10 15

tcg cag gga cgc acc ata tcg cag gca ccc gcc cgc cgc gag cgg ccg 96
Ser Gln Gly Arg Thr Ile Ser Gln Ala Pro Ala Arg Arg Glu Arg Pro
20 25 30

cgc aag gac ccg ctg cgg cac ctg cgc acg cga gag aag cgc gga ccg 144
Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
35 40 45

tcg ggg tgc tcc ggg ggc cca aac acc gtg tac ctg cag gtg gtg gca 192
Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
50 55 60

gcg ggt agc cgg gac tcg ggc gcc gcg ctc tac gtc ttc tcc gag ttc 240
Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
65 70 75 80

aac cgg tat ctc ttc aac tgt gga gaa ggc gtt cag aga ctc atg cag 288
Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Val Gln Arg Leu Met Gln
85 90 95

gag cac aag tta aag gtt gtt cgc ctg gac aac ata ttc ctg aca cga 336
Glu His Lys Leu Lys Val Val Arg Leu Asp Asn Ile Phe Leu Thr Arg
100 105 110

atg cac tgg tct aat gtt ggg ggc tta agt gga atg att ctt act tta 384
Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
115 120 125

```
aag gaa acc ggg ctt cca aag tgt gta ctt tct gga cct cca cag ctg   432
Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
    130                 135                 140

gaa aaa tac ctc gaa gca atc aaa ata ttt tct ggt cca ttg aaa gga   480
Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
145                 150                 155                 160

ata gaa ctg gct gtg cgg ccc cac tct gcc cca gaa tac gag gat gaa   528
Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
                165                 170                 175

acc atg aca gtt tac cag atc ccc ata cac agt gaa cag agg agg gga   576
Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
            180                 185                 190

agg cac caa cca tgg cag agt cca gaa agg cct ctc agc agg ctc agt   624
Arg His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
        195                 200                 205

cca gag cga tct tca gac tcc gag tcg aat gaa aat gag cca cac ctt   672
Pro Glu Arg Ser Ser Asp Ser Glu Ser Asn Glu Asn Glu Pro His Leu
    210                 215                 220

cca cat ggt gtt agc cag aga aga ggg gtc agg gac tct tcc ctg gtc   720
Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
225                 230                 235                 240

gta gct ttc atc tgt aag ctt cac tta aag aga gga aac ttc ttg gtg   768
Val Ala Phe Ile Cys Lys Leu His Leu Lys Arg Gly Asn Phe Leu Val
                245                 250                 255

ctc aaa gca aag gag atg ggc ctc cca gtt ggg aca gct gcc atc gct   816
Leu Lys Ala Lys Glu Met Gly Leu Pro Val Gly Thr Ala Ala Ile Ala
            260                 265                 270

ccc atc att gct gct gtc aag gac ggg aaa agc atc act cat gaa gga   864
Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
        275                 280                 285

aga gag att ttg gct gaa gag ctg tgt act cct cca gat cct ggt gct   912
Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
    290                 295                 300

gct ttt gtg gtg gta gaa tgt cca gat gaa agc ttc att caa ccc atc   960
Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
305                 310                 315                 320

tgt gag aat gcc acc ttt cag agg tac caa gga aag gca gat gcc ccc  1008
Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
                325                 330                 335

gtg gcc ttg gtg gtt cac atg gcc cca gaa tct gtg ctt gtg gac agc  1056
Val Ala Leu Val Val His Met Ala Pro Glu Ser Val Leu Val Asp Ser
            340                 345                 350

agg tac cag cag tgg atg gag agg ttt ggg cct gac acc cag cac ttg  1104
Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr Gln His Leu
        355                 360                 365

gtc ctg aat gag aac tgt gcc tca gtt cac aac ctt cgc agc cac aag  1152
Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
    370                 375                 380
```

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att caa acc cag ctc aac ctc atc cac ccg gac atc ttc ccc ctg ctc    1200
Ile Gln Thr Gln Leu Asn Leu Ile His Pro Asp Ile Phe Pro Leu Leu
385                 390                 395                 400

acc agt ttc ccc tgt aag aag gag ggc ccc acc ctc agt gtg ccc atg    1248
Thr Ser Phe Pro Cys Lys Lys Glu Gly Pro Thr Leu Ser Val Pro Met
                405                 410                 415

gtt cag ggt gaa tgc ctc ctc aag tac cag ctc cgt ccc agg agg gaa    1296
Val Gln Gly Glu Cys Leu Leu Lys Tyr Gln Leu Arg Pro Arg Arg Glu
            420                 425                 430

tgg cag agg gat gcc att atc act tgc aat cct gag gaa ttc ata gtt    1344
Trp Gln Arg Asp Ala Ile Ile Thr Cys Asn Pro Glu Glu Phe Ile Val
        435                 440                 445

gag gcg ctg cag ctt ccc aac ttc cag cag agt gtg cag gag tac agg    1392
Glu Ala Leu Gln Leu Pro Asn Phe Gln Gln Ser Val Gln Glu Tyr Arg
    450                 455                 460

agg agt gtg cag gac gtc cca gcc cca gca gag aaa aga agt cag tac    1440
Arg Ser Val Gln Asp Val Pro Ala Pro Ala Glu Lys Arg Ser Gln Tyr
465                 470                 475                 480

cca gaa atc atc ttc ctt gga aca ggg tct gcc atc ccc atg aag att    1488
Pro Glu Ile Ile Phe Leu Gly Thr Gly Ser Ala Ile Pro Met Lys Ile
                485                 490                 495

cga aat gtc agt gcc aca ctt gtc aac ata agc ccc gac acg tct ctg    1536
Arg Asn Val Ser Ala Thr Leu Val Asn Ile Ser Pro Asp Thr Ser Leu
            500                 505                 510

cta ctg gac tgt ggt gag ggc acg ttt ggg cag ctg tgc cgt cat tac    1584
Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys Arg His Tyr
        515                 520                 525

gga gac cag gtg gac agg gtc ctg ggc acc ctg gct gct gtg ttt gtg    1632
Gly Asp Gln Val Asp Arg Val Leu Gly Thr Leu Ala Ala Val Phe Val
    530                 535                 540

tcc cac ctg cac gca gat cac cac acg ggc ttg cta aat atc ttg ctg    1680
Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn Ile Leu Leu
545                 550                 555                 560

cag aga gaa caa gcc ttg gca tct ttg gga aag ccc ctt cac cct ttg    1728
Gln Arg Glu Gln Ala Leu Ala Ser Leu Gly Lys Pro Leu His Pro Leu
                565                 570                 575

ctg gtg gtt gcc ccc agc cag ctc aaa gcc tgg ctc cag cag tac cac    1776
Leu Val Val Ala Pro Ser Gln Leu Lys Ala Trp Leu Gln Gln Tyr His
            580                 585                 590

aac cag tgc cag gag gtc ctg cac cac atc agt atg att cct gcc aaa    1824
Asn Gln Cys Gln Glu Val Leu His His Ile Ser Met Ile Pro Ala Lys
        595                 600                 605

tgc ctt cag gaa ggg gct gag atc tcc agt cct gca gtg gaa aga ttg    1872
Cys Leu Gln Glu Gly Ala Glu Ile Ser Ser Pro Ala Val Glu Arg Leu
    610                 615                 620

atc agt tcg ctg ttg cga aca tgt gat ttg gaa gag ttt cag acc tgt    1920
Ile Ser Ser Leu Leu Arg Thr Cys Asp Leu Glu Glu Phe Gln Thr Cys
625                 630                 635                 640
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ctg gtg cgg cac tgc aag cat gcg ttt ggc tgt gcg ctg gtg cac acc   1968
Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu Val His Thr
                645                 650                 655

tct ggc tgg aaa gtg gtc tat tcc ggg gac acc atg ccc tgc gag gct   2016
Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
            660                 665                 670

ctg gtc cgc atg ggg aaa gat gcc acc ctc ctg ata cat gaa gcc acc   2064
Leu Val Arg Met Gly Lys Asp Ala Thr Leu Leu Ile His Glu Ala Thr
        675                 680                 685

ctg gaa gat ggt ttg gaa gag gaa gca gtg gaa aag aca cac agc aca   2112
Leu Glu Asp Gly Leu Glu Glu Glu Ala Val Glu Lys Thr His Ser Thr
    690                 695                 700

acg tcc caa gcc atc agc gtg ggg atg cgg atg aac gcg gag ttc att   2160
Thr Ser Gln Ala Ile Ser Val Gly Met Arg Met Asn Ala Glu Phe Ile
705                 710                 715                 720

atg ctg aac cac ttc agc cag cgc tat gcc aag gtc ccc ctc ttc agc   2208
Met Leu Asn His Phe Ser Gln Arg Tyr Ala Lys Val Pro Leu Phe Ser
                725                 730                 735

ccc aac ttc aac gag aaa gtg gga gtt gcc ttt gac cac atg aag gtc   2256
Pro Asn Phe Asn Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
            740                 745                 750

tgc ttt gga gac ttt cca aca atg ccc aag ctg att ccc cca ctg aaa   2304
Cys Phe Gly Asp Phe Pro Thr Met Pro Lys Leu Ile Pro Pro Leu Lys
        755                 760                 765

gcc ctg ttt gcc ggc gac atc gag gag atg gag gag cgc agg gag aag   2352
Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Glu Glu Arg Arg Glu Lys
    770                 775                 780

cgg gag ctg cgg cag gtg cgg gcg gcc ctc ctg tcc ggg gag ctg gca   2400
Arg Glu Leu Arg Gln Val Arg Ala Ala Leu Leu Ser Gly Glu Leu Ala
785                 790                 795                 800

ggc ggc ctg gag gat ggg gag cct cag cag aaa cgg gcc cac aca gag   2448
Gly Gly Leu Glu Asp Gly Glu Pro Gln Gln Lys Arg Ala His Thr Glu
                805                 810                 815

gag cca cag gcc aag aag gtc aga gcc cag tgaagatctg ggagaccctg     2498
Glu Pro Gln Ala Lys Lys Val Arg Ala Gln
            820                 825

aattcagaag gctgtgtgtc ttctgcccca cgcacgcacc cgtatctgcc ctccttgctg 2558

gtagaagctg aagagcacgg tcccccagga ggcagctcag gataggtggt atggagctgt 2618

gccgaggctt aggctcccac ataagcacta gtctataggt gcctggcaca gccgcgggac 2678

aggaggctgc cacacggaag caagcagatg aactaatttc atttcaaggc agtttttaaa 2738

gaagtcttgg aaacagacgg cagcaccttt cctctaatcc agcaaagtga ttccctgcac 2798

accagagaca agcagagtaa caggatcact gggtctaagt gtccgagact taacgaaaat 2858

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<210> 226
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<212> PRT
<213> Gorilla gorilla

<400> 226

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             20                  25                  30

Arg Lys Asp Pro Leu Arg His Leu Arg Thr Arg Glu Lys Arg Gly Pro
         35                  40                  45

Ser Gly Cys Ser Gly Gly Pro Asn Thr Val Tyr Leu Gln Val Val Ala
     50                  55                  60

Ala Gly Ser Arg Asp Ser Gly Ala Ala Leu Tyr Val Phe Ser Glu Phe
 65                  70                  75                  80

Asn Arg Tyr Leu Phe Asn Cys Gly Glu Gly Val Gln Arg Leu Met Gln
                 85                  90                  95

Glu His Lys Leu Lys Val Val Arg Leu Asp Asn Ile Phe Leu Thr Arg
            100                 105                 110

Met His Trp Ser Asn Val Gly Gly Leu Ser Gly Met Ile Leu Thr Leu
        115                 120                 125

Lys Glu Thr Gly Leu Pro Lys Cys Val Leu Ser Gly Pro Pro Gln Leu
    130                 135                 140

Glu Lys Tyr Leu Glu Ala Ile Lys Ile Phe Ser Gly Pro Leu Lys Gly
145                 150                 155                 160

Ile Glu Leu Ala Val Arg Pro His Ser Ala Pro Glu Tyr Glu Asp Glu
                165                 170                 175

Thr Met Thr Val Tyr Gln Ile Pro Ile His Ser Glu Gln Arg Arg Gly
            180                 185                 190

Arg His Gln Pro Trp Gln Ser Pro Glu Arg Pro Leu Ser Arg Leu Ser
        195                 200                 205

Pro Glu Arg Ser Ser Asp Ser Glu Ser Asn Glu Asn Glu Pro His Leu
    210                 215                 220

Pro His Gly Val Ser Gln Arg Arg Gly Val Arg Asp Ser Ser Leu Val
225                 230                 235                 240

Val Ala Phe Ile Cys Lys Leu His Leu Lys Arg Gly Asn Phe Leu Val
                245                 250                 255

Leu Lys Ala Lys Glu Met Gly Leu Pro Val Gly Thr Ala Ala Ile Ala
            260                 265                 270

Pro Ile Ile Ala Ala Val Lys Asp Gly Lys Ser Ile Thr His Glu Gly
        275                 280                 285

Arg Glu Ile Leu Ala Glu Glu Leu Cys Thr Pro Pro Asp Pro Gly Ala
    290                 295                 300
```

```
Ala Phe Val Val Val Glu Cys Pro Asp Glu Ser Phe Ile Gln Pro Ile
305                 310                 315                 320

Cys Glu Asn Ala Thr Phe Gln Arg Tyr Gln Gly Lys Ala Asp Ala Pro
                325                 330                 335

Val Ala Leu Val Val His Met Ala Pro Glu Ser Val Leu Val Asp Ser
            340                 345                 350

Arg Tyr Gln Gln Trp Met Glu Arg Phe Gly Pro Asp Thr Gln His Leu
        355                 360                 365

Val Leu Asn Glu Asn Cys Ala Ser Val His Asn Leu Arg Ser His Lys
    370                 375                 380

Ile Gln Thr Gln Leu Asn Leu Ile His Pro Asp Ile Phe Pro Leu Leu
385                 390                 395                 400

Thr Ser Phe Pro Cys Lys Lys Glu Gly Pro Thr Leu Ser Val Pro Met
                405                 410                 415

Val Gln Gly Glu Cys Leu Leu Lys Tyr Gln Leu Arg Pro Arg Arg Glu
            420                 425                 430

Trp Gln Arg Asp Ala Ile Ile Thr Cys Asn Pro Glu Glu Phe Ile Val
        435                 440                 445

Glu Ala Leu Gln Leu Pro Asn Phe Gln Gln Ser Val Gln Glu Tyr Arg
    450                 455                 460

Arg Ser Val Gln Asp Val Pro Ala Pro Ala Glu Lys Arg Ser Gln Tyr
465                 470                 475                 480

Pro Glu Ile Ile Phe Leu Gly Thr Gly Ser Ala Ile Pro Met Lys Ile
                485                 490                 495

Arg Asn Val Ser Ala Thr Leu Val Asn Ile Ser Pro Asp Thr Ser Leu
            500                 505                 510

Leu Leu Asp Cys Gly Glu Gly Thr Phe Gly Gln Leu Cys Arg His Tyr
        515                 520                 525

Gly Asp Gln Val Asp Arg Val Leu Gly Thr Leu Ala Ala Val Phe Val
    530                 535                 540

Ser His Leu His Ala Asp His His Thr Gly Leu Leu Asn Ile Leu Leu
545                 550                 555                 560

Gln Arg Glu Gln Ala Leu Ala Ser Leu Gly Lys Pro Leu His Pro Leu
                565                 570                 575

Leu Val Val Ala Pro Ser Gln Leu Lys Ala Trp Leu Gln Gln Tyr His
            580                 585                 590

Asn Gln Cys Gln Glu Val Leu His His Ile Ser Met Ile Pro Ala Lys
        595                 600                 605

Cys Leu Gln Glu Gly Ala Glu Ile Ser Ser Pro Ala Val Glu Arg Leu
    610                 615                 620

Ile Ser Ser Leu Leu Arg Thr Cys Asp Leu Glu Glu Phe Gln Thr Cys
625                 630                 635                 640
```

```
Leu Val Arg His Cys Lys His Ala Phe Gly Cys Ala Leu Val His Thr
                645                 650                 655

Ser Gly Trp Lys Val Val Tyr Ser Gly Asp Thr Met Pro Cys Glu Ala
            660                 665                 670

Leu Val Arg Met Gly Lys Asp Ala Thr Leu Leu Ile His Glu Ala Thr
        675                 680                 685

Leu Glu Asp Gly Leu Glu Glu Glu Ala Val Glu Lys Thr His Ser Thr
    690                 695                 700

Thr Ser Gln Ala Ile Ser Val Gly Met Arg Met Asn Ala Glu Phe Ile
705                 710                 715                 720

Met Leu Asn His Phe Ser Gln Arg Tyr Ala Lys Val Pro Leu Phe Ser
                725                 730                 735

Pro Asn Phe Asn Glu Lys Val Gly Val Ala Phe Asp His Met Lys Val
            740                 745                 750

Cys Phe Gly Asp Phe Pro Thr Met Pro Lys Leu Ile Pro Pro Leu Lys
        755                 760                 765

Ala Leu Phe Ala Gly Asp Ile Glu Glu Met Glu Glu Arg Arg Glu Lys
    770                 775                 780

Arg Glu Leu Arg Gln Val Arg Ala Ala Leu Leu Ser Gly Glu Leu Ala
785                 790                 795                 800

Gly Gly Leu Glu Asp Gly Glu Pro Gln Gln Lys Arg Ala His Thr Glu
                805                 810                 815

Glu Pro Gln Ala Lys Lys Val Arg Ala Gln
            820                 825
```

<210> 227
<211> 844
<212> PRT
<213> Caenorhabditis elegans

<400> 227

```
Met Lys Met Leu Phe Phe Gly Ile Lys Val Ser Arg His Leu Ile Ser
  1               5                  10                  15

Ser Thr Ser Cys Leu Phe Lys Asp Asn Asn Glu Glu Leu Leu Glu Ser
            20                  25                  30

Ile Lys Glu Arg Ile Ala Arg Asn Arg Arg Ile Leu Gln Lys His Ser
        35                  40                  45

Ser Ser His Leu Lys Ala Arg Glu Val Asn Ala Ser Ile Ser Asn Leu
    50                  55                  60

Arg Gln Ser Met Ala Ala Val Gln Lys Lys Gln Lys Ala Ala His Glu
65                  70                  75                  80

Pro Pro Ala Asn Ser Ile Val Asn Ile Pro Ser Gln Val Ser Ile Glu
                85                  90                  95

Val Leu Gly Asn Gly Thr Gly Leu Leu Arg Ala Cys Phe Ile Leu Arg
            100                 105                 110
```

Thr Pro Leu Lys Thr Tyr Met Phe Asn Cys Pro Glu Asn Ala Cys Arg
115 120 125

Phe Leu Trp Gln Leu Arg Ile Arg Ser Ser Ser Val Val Asp Leu Phe
130 135 140

Ile Thr Ser Ala Asn Trp Asp Asn Ile Ala Gly Ile Ser Ser Ile Leu
145 150 155 160

Leu Ser Lys Glu Ser Asn Ala Leu Ser Thr Arg Leu His Gly Ala Met
165 170 175

Asn Ile Lys His Phe Leu Glu Cys Ile Arg Pro Phe Gln Asp Ser Asp
180 185 190

Tyr Gly Ser Cys Lys Tyr Pro Ser Gln Val Glu Glu Arg Pro Tyr Thr
195 200 205

Met Glu Asn Tyr Glu Asp Ala Gly Leu Lys Val Thr Tyr Ile Pro Leu
210 215 220

Ser Pro Pro Leu Asn Ile Gly Ser Asn Asn Glu Lys Ser Lys Asn Val
225 230 235 240

Lys Val Asn Asn Val Asp Ile Ala Phe Leu Ile Glu Met Lys Glu Ala
245 250 255

Ala Arg Arg Ile Asp Thr Met Lys Leu Met Glu Leu Lys Val Pro Lys
260 265 270

Gly Pro Leu Ile Gly Lys Leu Lys Ser Gly Glu Ala Val Thr Leu Pro
275 280 285

Asp Gly Arg Thr Ile Gln Pro Asp Gln Val Phe Ser Ser Asp Lys Val
290 295 300

Glu Gly Asp Lys Pro Leu Leu Leu Val Thr Glu Cys Thr Thr Glu Asp
305 310 315 320

His Val Lys Ala Leu Ile Asp Ser Ser Ser Leu Gln Pro Phe Leu Asn
325 330 335

Gly Glu Lys Gln Leu Asp Tyr Met Val His Ile Ser Asp Asp Ala Val
340 345 350

Ile Asn Thr Pro Thr Tyr Arg His Leu Met Glu Lys Leu Asn Asn Pro
355 360 365

Ser Ile Thr His Leu Leu Ile Asn Gly Gly Asn Pro Val Ile Pro Ala
370 375 380

Val Glu Ser Val Tyr Lys His Thr Arg Leu Leu Arg Ser Ile Ala Pro
385 390 395 400

Ser Leu Phe Pro Ala Leu His Pro Ile Asp Trp Ser Gly Ile Ile Thr
405 410 415

Gln Asn Glu Glu Leu Ser Gln Arg Gln Asp Gln Phe Ile Arg Val Ala
420 425 430

Pro Met Gln Arg Tyr Trp Met Arg Arg Gly Ala Ser Phe Asn Glu Glu
435 440 445

```
Pro Ile Val Asn Asn Leu Leu Ala Ala Glu Pro Glu Leu Ser Asp Lys
    450                 455                 460

Ala Lys Glu Leu Ile Lys Glu Tyr Gln Lys Leu Glu Lys Glu Asn Lys
465                 470                 475                 480

Met Asp Cys Glu Phe Pro Lys Leu Thr Phe Phe Gly Thr Ser Ser Ala
                485                 490                 495

Val Pro Ser Lys Tyr Arg Asn Val Thr Gly Tyr Leu Val Glu Ala Ser
            500                 505                 510

Glu Asn Ser Ala Ile Leu Ile Asp Val Gly Glu Gly Thr Tyr Gly Gln
        515                 520                 525

Met Arg Ala Val Phe Gly Glu Asp Gly Cys Lys Gln Leu Leu Val Asn
    530                 535                 540

Leu Asn Cys Val Leu Ile Thr His Ala His Gln Asp His Met Asn Gly
545                 550                 555                 560

Leu Tyr Thr Ile Ile Ala Arg Arg Lys Glu Ala Phe Glu Ser Leu Gly
                565                 570                 575

Ala Pro Tyr Arg Pro Leu Val Leu Val Cys Asn Arg Asn Val Leu Lys
            580                 585                 590

Pro Met Lys Thr Tyr Ser Ile Cys Phe Glu Asn Ile Glu His Leu Leu
        595                 600                 605

Glu Ile Val Asp Ile Ser Arg Tyr Pro Leu Thr Pro Pro Gly Ser Pro
    610                 615                 620

Gly Gly Pro Pro Gly Lys Arg Pro Arg Leu Pro Ser Pro His Leu Pro
625                 630                 635                 640

Pro Ser Arg Asp Val Leu Gln Asp Met Ser Ser Ser Phe Asp Lys Lys
                645                 650                 655

Ala Trp Lys Leu Asp Glu Leu Lys Ala Val Gln Val His His Thr Arg
            660                 665                 670

Met Ala Asn Gly Phe Val Met Arg Val Ala Gly Lys Arg Ile Val Phe
        675                 680                 685

Ser Gly Asp Thr Lys Pro Cys Asp Leu Leu Val Glu Glu Gly Lys Asp
    690                 695                 700

Ala Asp Val Leu Val His Glu Ser Thr Phe Glu Asp Gly His Glu Val
705                 710                 715                 720

Asp Met Thr Pro Lys Pro Pro Lys Lys Leu Ala Lys Ile Ser Ser Leu
                725                 730                 735

Ala Asp Ala Met Arg Lys Arg His Ser Thr Met Gly Gln Ala Val Asp
            740                 745                 750

Val Gly Lys Arg Met Asn Ala Lys His Ile Ile Leu Thr His Phe Ser
        755                 760                 765

Ala Arg Tyr Pro Lys Val Pro Val Leu Pro Glu Tyr Leu Asp Lys Glu
    770                 775                 780
```

Asn Ile Gly Val Ala Met Asp Met Leu Arg Val Arg Phe Asp His Leu
785 790 795 800

Pro Leu Val Ser Lys Leu Leu Pro Ile Phe Arg Glu Val Phe Val Ala
805 810 815

Glu Leu Phe Glu Leu Thr Ile Lys Lys Glu Gln Arg Val Leu Lys Asp
820 825 830

Lys Glu Leu Ser Glu Lys Arg Gly Gln Leu Lys Ala
835 840

<210> 228
<211> 837
<212> PRT
<213> Arabidopsis thaliana

<400> 228
Met Glu Asn Asn Glu Ala Thr Asn Gly Ser Lys Ser Ser Ser Asn Ser
1 5 10 15

Phe Val Phe Asn Lys Arg Arg Ala Glu Gly Phe Asp Ile Thr Asp Lys
20 25 30

Lys Lys Arg Asn Leu Glu Arg Lys Ser Gln Lys Leu Asn Pro Thr Asn
35 40 45

Thr Ile Ala Tyr Ala Gln Ile Leu Gly Thr Gly Met Asp Thr Gln Asp
50 55 60

Thr Ser Ser Ser Val Leu Leu Phe Phe Asp Lys Gln Arg Phe Ile Phe
65 70 75 80

Asn Ala Gly Glu Gly Leu Gln Arg Phe Cys Thr Glu His Lys Ile Lys
85 90 95

Leu Ser Lys Ile Asp His Val Phe Leu Ser Arg Val Cys Ser Glu Thr
100 105 110

Ala Gly Gly Leu Pro Gly Leu Leu Leu Thr Leu Ala Gly Ile Gly Glu
115 120 125

Glu Gly Leu Ser Val Asn Val Trp Gly Pro Ser Asp Leu Asn Tyr Leu
130 135 140

Val Asp Ala Met Lys Ser Phe Ile Pro Arg Ala Ala Met Val His Thr
145 150 155 160

Arg Ser Phe Gly Pro Ser Ser Thr Pro Asp Pro Ile Val Leu Val Asn
165 170 175

Asp Glu Val Val Lys Ile Ser Ala Ile Ile Leu Lys Pro Cys His Ser
180 185 190

Glu Glu Asp Ser Gly Asn Lys Ser Gly Asp Leu Ser Val Val Tyr Val
195 200 205

Cys Glu Leu Pro Glu Ile Leu Gly Lys Phe Asp Leu Glu Lys Ala Lys
210 215 220

Lys Val Phe Gly Val Lys Pro Gly Pro Lys Tyr Ser Arg Leu Gln Ser
225 230 235 240

Gly Glu Ser Val Lys Ser Asp Glu Arg Asp Ile Thr Val His Pro Ser
245 250 255

Asp Val Met Gly Pro Ser Leu Pro Gly Pro Ile Val Leu Leu Val Asp
260 265 270

Cys Pro Thr Glu Ser His Ala Ala Glu Leu Phe Ser Leu Lys Ser Leu
275 280 285

Glu Ser Tyr Tyr Ser Ser Pro Asp Glu Gln Thr Ile Gly Ala Lys Phe
290 295 300

Val Asn Cys Ile Ile His Leu Ser Pro Ser Ser Val Thr Ser Ser Pro
305 310 315 320

Thr Tyr Gln Ser Trp Met Lys Lys Phe His Leu Thr Gln His Ile Leu
325 330 335

Ala Gly His Gln Arg Phe Leu Pro Leu Leu Ile Ile Val Ser His Gln
340 345 350

Lys Thr Val Arg Lys Asn Met Ala Phe Pro Ile Leu Lys Ala Ser Ser
355 360 365

Arg Ile Ala Ala Arg Leu Asn Tyr Leu Cys Pro Gln Phe Phe Pro Ala
370 375 380

Pro Gly Phe Trp Pro Ser Gln Leu Thr Asp Asn Ser Ile Ile Asp Pro
385 390 395 400

Thr Pro Ser Asn Lys Phe Asn Leu Arg Pro Val Ala Ile Arg Gly Ile
405 410 415

Asp Arg Ser Cys Ile Pro Ala Pro Leu Thr Ser Ser Glu Val Val Asp
420 425 430

Glu Leu Leu Ser Glu Ile Pro Glu Ile Lys Asp Lys Ser Glu Glu Ile
435 440 445

Lys Gln Phe Trp Asn Lys Gln His Asn Lys Thr Ile Ile Glu Lys Leu
450 455 460

Trp Leu Ser Glu Cys Asn Thr Val Leu Pro Asn Cys Leu Glu Lys Ile
465 470 475 480

Arg Arg Asp Asp Met Glu Ile Val Ile Leu Gly Thr Gly Ser Ser Gln
485 490 495

Pro Ser Lys Tyr Arg Asn Val Ser Ala Ile Phe Ile Asp Leu Phe Ser
500 505 510

Arg Gly Ser Leu Leu Leu Asp Cys Gly Glu Gly Thr Leu Gly Gln Leu
515 520 525

Lys Arg Arg Tyr Gly Leu Asp Gly Ala Asp Glu Ala Val Arg Lys Leu
530 535 540

Arg Cys Ile Trp Ile Ser His Ile His Ala Asp His His Thr Gly Leu
545 550 555 560

Ala Arg Ile Leu Ala Leu Arg Ser Lys Leu Leu Lys Gly Val Thr His
565 570 575

```
Glu Pro Val Ile Val Val Gly Pro Arg Pro Leu Lys Arg Phe Leu Asp
            580                 585                 590

Ala Tyr Gln Arg Leu Glu Asp Leu Asp Met Glu Phe Leu Asp Cys Arg
        595                 600                 605

Ser Thr Thr Ala Thr Ser Trp Ala Ser Leu Glu Ser Gly Gly Glu Ala
    610                 615                 620

Glu Gly Ser Leu Phe Thr Gln Gly Ser Pro Met Gln Ser Val Phe Lys
625                 630                 635                 640

Arg Ser Asp Ile Ser Met Asp Asn Ser Ser Val Leu Leu Cys Leu Lys
                645                 650                 655

Asn Leu Lys Lys Val Leu Ser Glu Ile Gly Leu Asn Asp Leu Ile Ser
            660                 665                 670

Phe Pro Val Val His Cys Pro Gln Ala Tyr Gly Val Val Ile Lys Ala
        675                 680                 685

Ala Glu Arg Val Asn Ser Val Gly Glu Gln Ile Leu Gly Trp Lys Met
    690                 695                 700

Val Tyr Ser Gly Asp Ser Arg Pro Cys Pro Glu Thr Val Glu Ala Ser
705                 710                 715                 720

Arg Asp Ala Thr Ile Leu Ile His Glu Ala Thr Phe Glu Asp Ala Leu
                725                 730                 735

Ile Glu Glu Ala Leu Ala Lys Asn His Ser Thr Thr Lys Glu Ala Ile
            740                 745                 750

Asp Val Gly Ser Ala Ala Asn Val Tyr Arg Ile Val Leu Thr His Phe
        755                 760                 765

Ser Gln Arg Tyr Pro Lys Ile Pro Val Ile Asp Glu Ser His Met His
    770                 775                 780

Asn Thr Cys Ile Ala Phe Asp Leu Met Ser Ile Asn Met Ala Asp Leu
785                 790                 795                 800

His Val Leu Pro Lys Val Leu Pro Tyr Phe Lys Thr Leu Phe Arg Asp
                805                 810                 815

Glu Met Val Glu Asp Glu Asp Ala Asp Asp Val Ala Met Asp Asp Leu
            820                 825                 830

Lys Glu Glu Ala Leu
        835
```

<210> 229
<211> 838
<212> PRT
<213> Saccharomyces cerevisiae

<400> 229

```
Met Phe Thr Phe Ile Pro Ile Thr His Pro Thr Ser Asp Thr Lys His
 1               5                  10                  15

Pro Leu Leu Leu Val Gln Ser Ala His Gly Glu Lys Tyr Phe Phe Gly
            20                  25                  30
```

```
Lys Ile Gly Glu Gly Ser Gln Arg Ser Leu Thr Glu Asn Lys Ile Arg
        35                  40                  45

Ile Ser Lys Leu Lys Asp Ile Phe Leu Thr Gly Glu Leu Asn Trp Ser
    50                  55                  60

Asp Ile Gly Gly Leu Pro Gly Met Ile Leu Thr Ile Ala Asp Gln Gly
65                  70                  75                  80

Lys Ser Asn Leu Val Leu His Tyr Gly Asn Asp Ile Leu Asn Tyr Ile
                85                  90                  95

Val Ser Thr Trp Arg Tyr Phe Val Phe Arg Phe Gly Ile Asp Leu Asn
            100                 105                 110

Asp His Ile Met Lys Asp Lys Glu Val Tyr Lys Asp Lys Ile Ile Ala
        115                 120                 125

Val Lys Ser Phe Asn Val Leu Lys Asn Gly Gly Glu Asp Arg Leu Gly
    130                 135                 140

Val Phe Asp Ser Phe Gln Lys Gly Val Leu Arg Ser Ile Val Ala Lys
145                 150                 155                 160

Met Phe Pro Lys His Ala Pro Thr Asp Arg Tyr Asp Pro Ser Ser Asp
                165                 170                 175

Pro His Leu Asn Val Glu Leu Pro Asp Leu Asp Ala Lys Val Glu Val
            180                 185                 190

Ser Thr Asn Tyr Glu Ile Ser Phe Ser Pro Val Arg Gly Lys Phe Lys
        195                 200                 205

Val Glu Glu Ala Ile Lys Leu Gly Val Pro Lys Gly Pro Leu Phe Ala
    210                 215                 220

Lys Leu Thr Lys Gly Gln Thr Ile Thr Leu Asp Asn Gly Ile Val Val
225                 230                 235                 240

Thr Pro Glu Gln Val Leu Glu Asn Glu Arg His Phe Ala Lys Val Leu
                245                 250                 255

Ile Leu Asp Ile Pro Asp Asp Leu Tyr Leu Asn Ala Phe Val Glu Lys
            260                 265                 270

Phe Lys Asp Tyr Asp Cys Ala Glu Leu Gly Met Val Tyr Tyr Phe Leu
        275                 280                 285

Gly Asp Glu Val Thr Ile Asn Asp Asn Leu Phe Ala Phe Ile Asp Ile
    290                 295                 300

Phe Glu Lys Asn Asn Tyr Gly Lys Val Asn His Met Ile Ser His Asn
305                 310                 315                 320

Lys Ile Ser Pro Asn Thr Ile Ser Phe Phe Gly Ser Ala Leu Thr Thr
                325                 330                 335

Leu Lys Leu Lys Ala Leu Gln Val Asn Asn Tyr Asn Leu Pro Lys Thr
            340                 345                 350

Asp Arg Val Phe Ser Lys Asp Phe Tyr Asp Arg Phe Asp Thr Pro Leu
        355                 360                 365
```

Ser Arg Gly Thr Ser Met Cys Lys Ser Gln Glu Glu Pro Leu Asn Thr
370 375 380

Ile Ile Glu Lys Asp Asn Ile His Ile Phe Ser Gln Asn Lys Thr Val
385 390 395 400

Thr Phe Glu Pro Phe Arg Met Asn Glu Glu Pro Met Lys Cys Asn Ile
405 410 415

Asn Gly Glu Val Ala Asp Phe Ser Trp Gln Glu Ile Phe Glu Glu His
420 425 430

Val Lys Pro Leu Glu Phe Pro Leu Ala Asp Val Asp Thr Val Ile Asn
435 440 445

Asn Gln Leu His Val Asp Asn Phe Asn Asn Ser Ala Glu Lys Lys Lys
450 455 460

His Val Glu Ile Ile Thr Leu Gly Thr Gly Ser Ala Leu Pro Ser Lys
465 470 475 480

Tyr Arg Asn Val Val Ser Thr Leu Val Lys Val Pro Phe Thr Asp Ala
485 490 495

Asp Gly Asn Thr Ile Asn Arg Asn Ile Met Leu Asp Ala Gly Glu Asn
500 505 510

Thr Leu Gly Thr Ile His Arg Met Phe Ser Gln Leu Ala Val Lys Ser
515 520 525

Ile Phe Gln Asp Leu Lys Met Ile Tyr Leu Ser His Leu His Ala Asp
530 535 540

His His Leu Gly Ile Ile Ser Val Leu Asn Glu Trp Tyr Lys Tyr Asn
545 550 555 560

Lys Asp Asp Glu Thr Ser Tyr Ile Tyr Val Val Thr Pro Trp Gln Tyr
565 570 575

His Lys Phe Val Asn Glu Trp Leu Val Leu Glu Asn Lys Glu Ile Leu
580 585 590

Lys Arg Ile Lys Tyr Ile Ser Cys Glu His Phe Ile Asn Asp Ser Phe
595 600 605

Val Arg Met Gln Thr Gln Ser Val Pro Leu Ala Glu Phe Asn Glu Ile
610 615 620

Leu Lys Glu Asn Ser Asn Gln Glu Ser Asn Arg Lys Leu Glu Leu Asp
625 630 635 640

Arg Asp Ser Ser Tyr Arg Asp Val Asp Leu Ile Arg Gln Met Tyr Glu
645 650 655

Asp Leu Ser Ile Glu Tyr Phe Gln Thr Cys Arg Ala Ile His Cys Asp
660 665 670

Trp Ala Tyr Ser Asn Ser Ile Thr Phe Arg Met Asp Glu Asn Asn Glu
675 680 685

His Asn Thr Phe Lys Val Ser Tyr Ser Gly Asp Thr Arg Pro Asn Ile
690 695 700

```
Glu Lys Phe Ser Leu Glu Ile Gly Tyr Asn Ser Asp Leu Leu Ile His
705                 710                 715                 720

Glu Ala Thr Leu Glu Asn Gln Leu Leu Glu Asp Ala Val Lys Lys Lys
                725                 730                 735

His Cys Thr Ile Asn Glu Ala Ile Gly Val Ser Asn Lys Met Asn Ala
            740                 745                 750

Arg Lys Leu Ile Leu Thr His Phe Ser Gln Arg Tyr Pro Lys Leu Pro
        755                 760                 765

Gln Leu Asp Asn Asn Ile Asp Val Met Ala Arg Glu Phe Cys Phe Ala
    770                 775                 780

Phe Asp Ser Met Ile Val Asp Tyr Glu Lys Ile Gly Glu Gln Gln Arg
785                 790                 795                 800

Ile Phe Pro Leu Leu Asn Lys Ala Phe Val Glu Glu Lys Glu Glu Glu
                805                 810                 815

Glu Asp Val Asp Asp Val Glu Ser Val Gln Asp Leu Glu Val Lys Leu
            820                 825                 830

Lys Lys His Lys Lys Asn
        835


<210> 230
<211> 311
<212> PRT
<213> Escherichia coli

<400> 230
Met Lys Arg Asp Glu Leu Met Glu Leu Ile Phe Leu Gly Thr Ser Ala
  1               5                  10                  15

Gly Val Pro Thr Arg Thr Arg Asn Val Thr Ala Ile Leu Leu Asn Leu
             20                  25                  30

Gln His Pro Thr Gln Ser Gly Leu Trp Leu Phe Asp Cys Gly Glu Gly
         35                  40                  45

Thr Gln His Gln Leu Leu His Thr Ala Phe Asn Pro Gly Lys Leu Asp
     50                  55                  60

Lys Ile Phe Ile Ser His Leu His Gly Asp His Leu Phe Gly Leu Pro
 65                  70                  75                  80

Gly Leu Leu Cys Ser Arg Ser Met Ser Gly Ile Ile Gln Pro Leu Thr
                 85                  90                  95

Ile Tyr Gly Pro Gln Gly Ile Arg Glu Phe Val Glu Thr Ala Leu Arg
            100                 105                 110

Ile Ser Gly Ser Trp Thr Asp Tyr Pro Leu Glu Ile Val Glu Ile Gly
        115                 120                 125

Ala Gly Glu Ile Leu Asp Asp Gly Leu Arg Lys Val Thr Ala Tyr Pro
    130                 135                 140

Leu Glu His Pro Leu Glu Cys Tyr Gly Tyr Arg Ile Glu Glu His Asp
145                 150                 155                 160
```

```
Lys Pro Gly Ala Leu Asn Ala Gln Ala Leu Lys Ala Ala Gly Val Pro
                165                 170                 175

Pro Gly Pro Leu Phe Gln Glu Leu Lys Ala Gly Lys Thr Ile Thr Leu
            180                 185                 190

Glu Asp Gly Arg Gln Ile Asn Gly Ala Asp Tyr Leu Ala Ala Pro Val
        195                 200                 205

Pro Gly Lys Ala Leu Ala Ile Phe Gly Asp Thr Gly Pro Cys Asp Ala
    210                 215                 220

Ala Leu Asp Leu Ala Lys Gly Val Asp Val Met Val His Glu Ala Thr
225                 230                 235                 240

Leu Asp Ile Thr Met Glu Ala Lys Ala Asn Ser Arg Gly His Ser Ser
                245                 250                 255

Thr Arg Gln Ala Ala Thr Leu Ala Arg Glu Ala Gly Val Gly Lys Leu
            260                 265                 270

Ile Ile Thr His Val Ser Ser Arg Tyr Asp Asp Lys Gly Cys Gln His
        275                 280                 285

Leu Leu Arg Glu Cys Arg Ser Ile Phe Pro Ala Thr Glu Leu Ala Asn
    290                 295                 300

Asp Phe Thr Val Phe Asn Val
305                 310


<210> 231
<211> 326
<212> PRT
<213> Synechocystis sp.

<400> 231
Met Glu Ile Thr Phe Leu Gly Thr Ser Ser Gly Val Pro Thr Arg Asn
  1               5                  10                  15

Arg Asn Val Ser Ser Ile Ala Leu Arg Leu Pro Gln Arg Ala Glu Leu
            20                  25                  30

Trp Leu Phe Asp Cys Gly Glu Gly Thr Gln His Gln Phe Leu Arg Ser
        35                  40                  45

Glu Val Lys Ile Ser Gln Leu Thr Arg Ile Phe Ile Thr His Leu His
    50                  55                  60

Gly Asp His Ile Phe Gly Leu Met Gly Leu Leu Ala Ser Ser Gly Leu
65                  70                  75                  80

Ala Gly Ser Gly Gln Gly Ile Glu Ile Tyr Gly Pro Glu Gly Leu Gly
                85                  90                  95

Asp Tyr Leu Glu Ala Cys Cys Arg Phe Ser Ser Thr His Leu Gly Lys
            100                 105                 110

Arg Leu Lys Val His Thr Val Arg Glu Asn Gly Leu Ile Tyr Glu Asp
        115                 120                 125

Lys Asp Phe Gln Val His Cys Gly Leu Leu Lys His Arg Ile Pro Ala
    130                 135                 140
```

```
Tyr Gly Tyr Arg Val Glu Glu Lys Gln Arg Pro Gly Arg Phe Asn Val
145                 150                 155                 160

Glu Gln Ala Glu Ala Leu Gly Ile Pro Phe Gly Pro Ile Tyr Gly Gln
                165                 170                 175

Leu Lys Gln Gly Lys Thr Val Thr Leu Glu Asp Gly Arg Arg Ile Arg
            180                 185                 190

Gly Gln Asp Leu Cys Glu Pro Pro Glu Pro Gly Arg Lys Phe Val Tyr
        195                 200                 205

Cys Thr Asp Thr Val Phe Cys Glu Glu Ala Ile Ala Leu Ala Gln Glu
    210                 215                 220

Ala Asp Leu Leu Val His Glu Ala Thr Phe Ala His Gln Asp Ala Gln
225                 230                 235                 240

Leu Ala Phe Asp Arg Leu His Ser Thr Ser Thr Met Ala Ala Gln Val
                245                 250                 255

Ala Leu Leu Ala Asn Val Lys Gln Leu Ile Met Thr His Phe Ser Pro
            260                 265                 270

Arg Tyr Ala Pro Gly Asn Pro Leu Gln Leu Glu Asn Leu Leu Ala Glu
        275                 280                 285

Ala Gln Ala Ile Phe Pro Asn Thr Arg Leu Ala Arg Asp Phe Leu Thr
    290                 295                 300

Val Glu Ile Pro Arg Arg Thr Ala Asp Pro Ala Ile Ala Met Ser Thr
305                 310                 315                 320

Pro Gln Ala Ser Pro Ala
                325
```

<210> 232
<211> 307
<212> PRT
<213> Methanobacterium thermoautotrophicum

<400> 232

```
Met Met Glu Val Thr Phe Leu Gly Thr Ser Ser Ala Val Pro Ser Lys
  1               5                  10                  15

Asn Arg Asn His Thr Ser Ile Ala Leu Arg Ile Pro Gly Glu Ile Phe
            20                  25                  30

Leu Phe Asp Cys Gly Glu Gly Thr Gln Arg Gln Met Ala Leu Ala Gly
        35                  40                  45

Ile Ser Pro Met Lys Val Thr Arg Ile Phe Ile Thr His Leu His Gly
    50                  55                  60

Asp His Ile Leu Gly Ile Pro Gly Met Ile Gln Ser Met Gly Phe Arg
65                  70                  75                  80

Gly Arg Glu Glu Pro Leu Asp Ile Tyr Gly Pro Pro Gly Ile His Glu
                85                  90                  95

Leu His Glu Cys Ile Met Lys Met Gly Tyr Phe Thr Leu Asp Phe Asp
            100                 105                 110
```

Ile Asn Val His Glu Val Arg Gly Gly Thr Val Val Glu Glu Asp Asp
115 120 125

Tyr Arg Val Thr Ser Ala Pro Ala Ser His Ser Val Phe Asn Leu Ala
130 135 140

Tyr Cys Phe Glu Glu Lys Lys Arg Pro Arg Phe Leu Arg Glu Lys Ala
145 150 155 160

Ile Ala Leu Gly Leu Lys Pro Gly Pro Ala Phe Gly Lys Leu His Arg
165 170 175

Gly Ile Pro Val Arg Val Gly Asp Arg Ile Ile Met Pro Glu Glu Val
180 185 190

Leu Gly Ser Pro Arg Lys Gly Val Lys Val Cys Tyr Ser Gly Asp Thr
195 200 205

Arg Pro Cys Glu Ser Val Ile Lys Leu Ala Glu Gly Ala Glu Leu Leu
210 215 220

Ile His Glu Ser Thr Leu Glu Ala Gly Ser Glu Asp Lys Ala Ala Glu
225 230 235 240

Ser Gly His Ser Thr Ala Arg Glu Ala Ala Glu Val Ala Arg Ser Ala
245 250 255

Gly Val Lys Arg Leu Ile Leu Thr His Leu Ser Thr Arg Tyr Lys Arg
260 265 270

Thr Glu Val Ile Leu Glu Ala Ala Arg Gln Val Phe Pro Val Thr Asp
275 280 285

Val Ala Asp Asp Leu Met Thr Val Glu Val Lys Ala Tyr Asp Ser Ser
290 295 300

Pro Asp Ser
305

<210> 233
<211> 684
<212> PRT
<213> Homo sapiens

<400> 233
Met Ser Ala Ile Pro Ala Glu Glu Ser Asp Gln Leu Leu Ile Arg Pro
1 5 10 15

Leu Gly Ala Gly Gln Glu Val Gly Arg Ser Cys Ile Ile Leu Glu Phe
20 25 30

Lys Gly Arg Lys Ile Met Leu Asp Cys Gly Ile His Pro Gly Leu Glu
35 40 45

Gly Met Asp Ala Leu Pro Tyr Ile Asp Leu Ile Asp Pro Ala Glu Ile
50 55 60

Asp Leu Leu Leu Ile Ser His Phe His Leu Asp His Cys Gly Ala Leu
65 70 75 80

Pro Trp Phe Leu Gln Lys Thr Ser Phe Lys Gly Arg Thr Phe Met Thr
85 90 95

```
His Ala Thr Lys Ala Ile Tyr Arg Trp Leu Leu Ser Asp Tyr Val Lys
            100                 105                 110

Val Ser Asn Ile Ser Ala Asp Asp Met Leu Tyr Thr Glu Thr Asp Leu
        115                 120                 125

Glu Glu Ser Met Asp Lys Ile Glu Thr Ile Asn Phe His Glu Val Lys
    130                 135                 140

Glu Val Ala Gly Ile Lys Phe Trp Cys Tyr His Ala Gly His Val Leu
145                 150                 155                 160

Gly Ala Ala Met Phe Met Ile Glu Ile Ala Gly Val Lys Leu Leu Tyr
                165                 170                 175

Thr Gly Asp Phe Ser Arg Gln Glu Asp Arg His Leu Met Ala Ala Glu
            180                 185                 190

Ile Pro Asn Ile Lys Pro Asp Ile Leu Ile Ile Glu Ser Thr Tyr Gly
        195                 200                 205

Thr His Ile His Glu Lys Arg Glu Glu Arg Glu Ala Arg Phe Cys Asn
    210                 215                 220

Thr Val His Asp Ile Val Asn Arg Gly Gly Arg Gly Leu Ile Pro Val
225                 230                 235                 240

Phe Ala Leu Gly Arg Ala Gln Glu Leu Leu Leu Ile Leu Asp Glu Tyr
                245                 250                 255

Trp Gln Asn His Pro Glu Leu His Asp Ile Pro Ile Tyr Tyr Ala Ser
            260                 265                 270

Ser Leu Ala Lys Lys Cys Met Ala Val Tyr Gln Thr Tyr Val Asn Ala
        275                 280                 285

Met Asn Asp Lys Ile Arg Lys Gln Ile Asn Ile Asn Asn Pro Phe Val
    290                 295                 300

Phe Lys His Ile Ser Asn Leu Lys Ser Met Asp His Phe Asp Asp Ile
305                 310                 315                 320

Gly Pro Ser Val Val Met Ala Ser Pro Gly Met Met Gln Ser Gly Leu
                325                 330                 335

Ser Arg Glu Leu Phe Glu Ser Trp Cys Thr Asp Lys Arg Asn Gly Val
            340                 345                 350

Ile Ile Ala Gly Tyr Cys Val Glu Gly Thr Leu Ala Lys His Ile Met
        355                 360                 365

Ser Glu Pro Glu Glu Ile Thr Thr Met Ser Gly Gln Lys Leu Pro Leu
    370                 375                 380

Lys Met Ser Val Asp Tyr Ile Ser Phe Ser Ala His Thr Asp Tyr Gln
385                 390                 395                 400

Gln Thr Ser Glu Phe Ile Arg Ala Leu Lys Pro Pro His Val Ile Leu
                405                 410                 415

Val His Gly Glu Gln Asn Glu Met Ala Arg Leu Lys Ala Ala Leu Ile
            420                 425                 430
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Arg Glu Tyr Glu Asp Asn Asp Glu Val His Ile Glu Val His Asn Pro
        435                 440                 445

Arg Asn Thr Glu Ala Val Thr Leu Asn Phe Arg Gly Glu Lys Leu Ala
    450                 455                 460

Lys Val Met Gly Phe Leu Ala Asp Lys Lys Pro Glu Gln Gly Gln Arg
465                 470                 475                 480

Val Ser Gly Ile Leu Val Lys Arg Asn Phe Asn Tyr His Ile Leu Ser
                485                 490                 495

Pro Cys Asp Leu Ser Asn Tyr Thr Asp Leu Ala Met Ser Thr Val Lys
            500                 505                 510

Gln Thr Gln Ala Ile Pro Tyr Thr Gly Pro Phe Asn Leu Leu Cys Tyr
        515                 520                 525

Gln Leu Gln Lys Leu Thr Gly Asp Val Glu Glu Leu Glu Ile Gln Glu
    530                 535                 540

Lys Pro Ala Leu Lys Val Phe Lys Asn Ile Thr Val Ile Gln Glu Pro
545                 550                 555                 560

Gly Met Val Val Leu Glu Trp Leu Ala Asn Pro Ser Asn Asp Met Tyr
                565                 570                 575

Ala Asp Thr Val Thr Thr Val Ile Leu Glu Val Gln Ser Asn Pro Lys
            580                 585                 590

Ile Arg Lys Gly Ala Val Gln Lys Val Ser Lys Lys Leu Glu Met His
        595                 600                 605

Val Tyr Ser Lys Arg Leu Glu Ile Met Leu Gln Asp Ile Phe Gly Glu
    610                 615                 620

Asp Cys Val Ser Val Lys Asp Asp Ser Ile Leu Ser Val Thr Val Asp
625                 630                 635                 640

Gly Lys Thr Ala Asn Leu Asn Leu Glu Thr Arg Thr Val Glu Cys Glu
                645                 650                 655

Glu Gly Ser Glu Asp Asp Glu Ser Leu Arg Glu Met Val Glu Leu Ala
            660                 665                 670

Ala Gln Arg Leu Tyr Glu Ala Leu Thr Pro Val His
        675                 680
```

<210> 234
<211> 693
<212> PRT
<213> Arabidopsis thaliana

<400> 234

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Met Ala Ser Ser Ser Thr Ser Leu Lys Arg Arg Glu Gln Pro Ile Ser
  1               5                  10                  15

Arg Asp Gly Asp Gln Leu Ile Val Thr Pro Leu Gly Ala Gly Ser Glu
            20                  25                  30

Val Gly Arg Ser Cys Val Tyr Met Ser Phe Arg Gly Lys Asn Ile Leu
        35                  40                  45
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Phe Asp Cys Gly Ile His Pro Ala Tyr Ser Gly Met Ala Ala Leu Pro
    50                  55                  60

Tyr Phe Asp Glu Ile Asp Pro Ser Ser Ile Asp Val Leu Leu Ile Thr
65                  70                  75                  80

His Phe His Ile Asp His Ala Ala Ser Leu Pro Tyr Phe Leu Glu Lys
                85                  90                  95

Thr Thr Phe Asn Gly Arg Val Phe Met Thr His Ala Thr Lys Ala Ile
            100                 105                 110

Tyr Lys Leu Leu Leu Thr Asp Tyr Val Lys Val Ser Lys Val Ser Val
        115                 120                 125

Glu Asp Met Leu Phe Asp Glu Gln Asp Ile Asn Lys Ser Met Asp Lys
    130                 135                 140

Ile Glu Val Ile Asp Phe His Gln Thr Val Glu Val Asn Gly Ile Lys
145                 150                 155                 160

Phe Trp Cys Tyr Thr Ala Gly His Val Leu Gly Ala Ala Met Phe Met
                165                 170                 175

Val Asp Ile Ala Gly Val Arg Ile Leu Tyr Thr Gly Asp Tyr Ser Arg
            180                 185                 190

Glu Glu Asp Arg His Leu Arg Ala Ala Glu Leu Pro Gln Phe Ser Pro
        195                 200                 205

Asp Ile Cys Ile Ile Glu Ser Thr Ser Gly Val Gln Leu His Gln Ser
    210                 215                 220

Arg His Ile Arg Glu Lys Arg Phe Thr Asp Val Ile His Ser Thr Val
225                 230                 235                 240

Ala Gln Gly Gly Arg Val Leu Ile Pro Ala Phe Ala Leu Gly Arg Ala
                245                 250                 255

Gln Glu Leu Leu Leu Ile Leu Asp Glu Tyr Trp Ala Asn His Pro Asp
            260                 265                 270

Leu His Asn Ile Pro Ile Tyr Tyr Ala Ser Pro Leu Ala Lys Lys Cys
        275                 280                 285

Met Ala Val Tyr Gln Thr Tyr Ile Leu Ser Met Asn Asp Arg Ile Arg
    290                 295                 300

Asn Gln Phe Ala Asn Ser Asn Pro Phe Val Phe Lys His Ile Ser Pro
305                 310                 315                 320

Leu Asn Ser Ile Asp Asp Phe Asn Asp Val Gly Pro Ser Val Val Met
                325                 330                 335

Ala Thr Pro Gly Gly Leu Gln Ser Gly Leu Ser Arg Gln Leu Phe Asp
            340                 345                 350

Ser Trp Cys Ser Asp Lys Lys Asn Ala Cys Ile Ile Pro Gly Tyr Met
        355                 360                 365

Val Glu Gly Thr Leu Ala Lys Thr Ile Ile Asn Glu Pro Lys Glu Val
    370                 375                 380
```

Thr Leu Met Asn Gly Leu Thr Ala Pro Leu Asn Met Gln Val His Tyr
385 390 395 400

Ile Ser Phe Ser Ala His Ala Asp Tyr Ala Gln Thr Ser Thr Phe Leu
405 410 415

Lys Glu Leu Met Pro Pro Asn Ile Ile Leu Val His Gly Glu Ala Asn
420 425 430

Glu Met Met Arg Leu Lys Gln Lys Leu Leu Thr Glu Phe Pro Asp Gly
435 440 445

Asn Thr Lys Ile Met Thr Pro Lys Asn Cys Glu Ser Val Glu Met Tyr
450 455 460

Phe Asn Ser Glu Lys Leu Ala Lys Thr Ile Gly Arg Leu Ala Glu Lys
465 470 475 480

Thr Pro Asp Val Gly Asp Thr Val Ser Gly Ile Leu Val Lys Lys Gly
485 490 495

Phe Thr Tyr Gln Ile Met Ala Pro Asp Glu Leu His Val Phe Ser Gln
500 505 510

Leu Ser Thr Ala Thr Val Thr Gln Arg Ile Thr Ile Pro Phe Val Gly
515 520 525

Ala Phe Gly Val Ile Lys His Arg Leu Glu Lys Ile Phe Glu Ser Val
530 535 540

Glu Phe Ser Thr Asp Glu Glu Ser Gly Leu Pro Ala Leu Lys Val His
545 550 555 560

Glu Arg Val Thr Val Lys Gln Glu Ser Glu Lys His Ile Ser Leu Gln
565 570 575

Trp Ser Ser Asp Pro Ile Ser Asp Met Val Ser Asp Ser Ile Val Ala
580 585 590

Leu Ile Leu Asn Ile Ser Arg Glu Val Pro Lys Ile Val Met Glu Glu
595 600 605

Glu Asp Ala Val Lys Ser Glu Glu Glu Asn Gly Lys Lys Val Glu Lys
610 615 620

Val Ile Tyr Ala Leu Leu Val Ser Leu Phe Gly Asp Val Lys Leu Gly
625 630 635 640

Glu Asn Gly Lys Leu Val Ile Arg Val Asp Gly Asn Val Ala Gln Leu
645 650 655

Asp Lys Glu Ser Gly Glu Val Glu Ser Glu His Ser Gly Leu Lys Glu
660 665 670

Arg Val Arg Val Ala Phe Glu Arg Ile Gln Ser Ala Val Lys Pro Ile
675 680 685

Pro Leu Ser Ala Ser
690

<210> 235
<211> 779
<212> PRT
<213> Saccharomyces cerevisiae

<400> 235
Met Glu Arg Thr Asn Thr Thr Thr Phe Lys Phe Phe Ser Leu Gly Gly
1 5 10 15

Ser Asn Glu Val Gly Arg Ser Cys His Ile Leu Gln Tyr Lys Gly Lys
20 25 30

Thr Val Met Leu Asp Ala Gly Ile His Pro Ala Tyr Gln Gly Leu Ala
35 40 45

Ser Leu Pro Phe Tyr Asp Glu Phe Asp Leu Ser Lys Val Asp Ile Leu
50 55 60

Leu Ile Ser His Phe His Leu Asp His Ala Ala Ser Leu Pro Tyr Val
65 70 75 80

Met Gln Arg Thr Asn Phe Gln Gly Arg Val Phe Met Thr His Pro Thr
85 90 95

Lys Ala Ile Tyr Arg Trp Leu Leu Arg Asp Phe Val Arg Val Thr Ser
100 105 110

Ile Gly Ser Ser Ser Ser Ser Met Gly Thr Lys Asp Glu Gly Leu Phe
115 120 125

Ser Asp Glu Asp Leu Val Asp Ser Phe Asp Lys Ile Glu Thr Val Asp
130 135 140

Tyr His Ser Thr Val Asp Val Asn Gly Ile Lys Phe Thr Ala Phe His
145 150 155 160

Ala Gly His Val Leu Gly Ala Ala Met Phe Gln Ile Glu Ile Ala Gly
165 170 175

Leu Arg Val Leu Phe Thr Gly Asp Tyr Ser Arg Glu Val Asp Arg His
180 185 190

Leu Asn Ser Ala Glu Val Pro Pro Leu Ser Ser Asn Val Leu Ile Val
195 200 205

Glu Ser Thr Phe Gly Thr Ala Thr His Glu Pro Arg Leu Asn Arg Glu
210 215 220

Arg Lys Leu Thr Gln Leu Ile His Ser Thr Val Met Arg Gly Gly Arg
225 230 235 240

Val Leu Leu Pro Val Phe Ala Leu Gly Arg Ala Gln Glu Ile Met Leu
245 250 255

Ile Leu Asp Glu Tyr Trp Ser Gln His Ala Asp Glu Leu Gly Gly Gly
260 265 270

Gln Val Pro Ile Phe Tyr Ala Ser Asn Leu Ala Lys Lys Cys Met Ser
275 280 285

Val Phe Gln Thr Tyr Val Asn Met Met Asn Asp Asp Ile Arg Lys Lys
290 295 300

Phe Arg Asp Ser Gln Thr Asn Pro Phe Ile Phe Lys Asn Ile Ser Tyr
305 310 315 320

Leu Arg Asn Leu Glu Asp Phe Gln Asp Phe Gly Pro Ser Val Met Leu
325 330 335

Ala Ser Pro Gly Met Leu Gln Ser Gly Leu Ser Arg Asp Leu Leu Glu
340 345 350

Arg Trp Cys Pro Glu Asp Lys Asn Leu Val Leu Ile Thr Gly Tyr Ser
355 360 365

Ile Glu Gly Thr Met Ala Lys Phe Ile Met Leu Glu Pro Asp Thr Ile
370 375 380

Pro Ser Ile Asn Asn Pro Glu Ile Thr Ile Pro Arg Arg Cys Gln Val
385 390 395 400

Glu Glu Ile Ser Phe Ala Ala His Val Asp Phe Gln Glu Asn Leu Glu
405 410 415

Phe Ile Glu Lys Ile Ser Ala Pro Asn Ile Ile Leu Val His Gly Glu
420 425 430

Ala Asn Pro Met Gly Arg Leu Lys Ser Ala Leu Leu Ser Asn Phe Ala
435 440 445

Ser Leu Lys Gly Thr Asp Asn Glu Val His Val Phe Asn Pro Arg Asn
450 455 460

Cys Val Glu Val Asp Leu Glu Phe Gln Gly Val Lys Val Ala Lys Ala
465 470 475 480

Val Gly Asn Ile Val Asn Glu Ile Tyr Lys Glu Glu Asn Val Glu Ile
485 490 495

Lys Glu Glu Ile Ala Ala Lys Ile Glu Pro Ile Lys Glu Glu Asn Glu
500 505 510

Asp Asn Leu Asp Ser Gln Ala Glu Lys Gly Leu Val Asp Glu Glu Glu
515 520 525

His Lys Asp Ile Val Val Ser Gly Ile Leu Val Ser Asp Asp Lys Asn
530 535 540

Phe Glu Leu Asp Phe Leu Ser Leu Ser Asp Leu Arg Glu His His Pro
545 550 555 560

Asp Leu Ser Thr Thr Ile Leu Arg Glu Arg Gln Ser Val Arg Val Asn
565 570 575

Cys Lys Lys Glu Leu Ile Tyr Trp His Ile Leu Gln Met Phe Gly Glu
580 585 590

Ala Glu Val Leu Gln Asp Asp Asp Arg Val Thr Asn Gln Glu Pro Lys
595 600 605

Val Lys Glu Glu Ser Lys Asp Asn Leu Thr Asn Thr Gly Lys Leu Ile
610 615 620

Leu Gln Ile Met Gly Asp Ile Lys Leu Thr Ile Val Asn Thr Leu Ala
625 630 635 640

Val Val Glu Trp Thr Gln Asp Leu Met Asn Asp Thr Val Ala Asp Ser
645 650 655

Ile Ile Ala Ile Leu Met Asn Val Asp Ser Ala Pro Ala Ser Val Lys
660 665 670

Leu Ser Ser His Ser Cys Asp Asp His Asp His Asn Asn Val Gln Ser
675 680 685

Asn Ala Gln Gly Lys Ile Asp Glu Val Glu Arg Val Lys Gln Ile Ser
690 695 700

Arg Leu Phe Lys Glu Gln Phe Gly Asp Cys Phe Thr Leu Phe Leu Asn
705 710 715 720

Lys Asp Glu Tyr Ala Ser Asn Lys Glu Glu Thr Ile Thr Gly Val Val
725 730 735

Thr Ile Gly Lys Ser Thr Ala Lys Ile Asp Phe Asn Asn Met Lys Ile
740 745 750

Leu Glu Cys Asn Ser Asn Pro Leu Lys Gly Arg Val Glu Ser Leu Leu
755 760 765

Asn Ile Gly Gly Asn Leu Val Thr Pro Leu Cys
770 775

<210> 236
<211> 554
<212> PRT
<213> Synechocystis sp.

<400> 236
Met Thr Phe Ser Val Pro Thr Gln Gly Lys Ala Phe Ala Asn Ile Ser
1 5 10 15

Phe Leu Pro Tyr Gly Val Gly Pro Arg Asp Gly Gly Ile Cys Leu Glu
20 25 30

Leu His Leu Gly Pro Tyr Arg Ile Leu Leu Asp Cys Gly Leu Glu Asp
35 40 45

Leu Thr Pro Leu Leu Ala Ala Asp Pro Gly Thr Val Asp Leu Val Phe
50 55 60

Cys Ser His Ala His Arg Asp His Gly Leu Gly Leu Trp Gln Phe His
65 70 75 80

Gln Gln Phe Pro His Ile Pro Ile Leu Ala Ser Glu Val Thr Gln Arg
85 90 95

Leu Leu Pro Leu Asn Trp Pro Asp Glu Phe Val Pro Pro Phe Cys Arg
100 105 110

Val Leu Pro Trp Arg Ser Pro Gln Glu Val Leu Pro Gly Leu Thr Val
115 120 125

Glu Leu Leu Pro Ala Gly His Leu Pro Gly Ala Ala Leu Ile Leu Leu
130 135 140

Glu Tyr His Asn Gly Asp Arg Leu Tyr Arg Val Ile Tyr Thr Gly Asp
145 150 155 160

Tyr Cys Leu Ser His Leu Gln Leu Val Asp Gly Leu Ala Leu Thr Pro
165 170 175

Leu Arg Gly Leu Lys Pro Asp Val Leu Ile Leu Glu Gly His Tyr Gly
180 185 190

Asn Arg Arg Leu Pro His Arg Arg Gln Gln Glu Lys Gln Phe Ile Gln
195 200 205

Ala Ile Glu Thr Val Leu Ala Lys Gly Arg Asn Ile Leu Leu Pro Val
210 215 220

Pro Pro Leu Gly Leu Ala Gln Glu Ile Leu Lys Leu Leu Arg Thr His
225 230 235 240

His Gln Phe Thr Gly Arg Gln Val Asn Leu Trp Ala Gly Glu Ser Val
245 250 255

Ala Arg Gly Cys Asp Ala Tyr Gln Gly Ile Ile Asp His Leu Pro Asp
260 265 270

Asn Val Arg Asn Phe Ala Gln His Gln Pro Leu Phe Trp Asp Asp Lys
275 280 285

Val Tyr Pro His Leu Arg Pro Leu Thr Asp Asp Gln Gly Glu Leu Ser
290 295 300

Leu Ser Ala Pro Ser Ile Val Ile Thr Thr Thr Trp Pro Ala Phe Trp
305 310 315 320

Pro Ser Pro Ala Ala Leu Pro Gly Leu Trp Thr Val Phe Met Pro Gln
325 330 335

Leu Leu Thr Leu Pro Ser Cys Leu Val Asn Phe Ala Trp Gln Asp Leu
340 345 350

Glu Glu Phe Pro Lys Tyr Glu Leu Glu Asp Tyr Leu Leu Ala Asp His
355 360 365

Ser Asp Gly Arg Asn Thr Thr Gln Leu Ile His Asn Leu Arg Pro Gln
370 375 380

His Leu Val Phe Val His Gly Gln Pro Ser Asp Ile Glu Asp Leu Thr
385 390 395 400

Ser Leu Glu Glu Leu Gln Ser Arg Tyr Gln Leu His Ser Pro Ala Ala
405 410 415

Gly Asn Ala Val Ala Leu Pro Ile Gly Asp Arg Phe Val Gln Pro Thr
420 425 430

Pro Pro Pro Pro Gln Ile Tyr Glu Gly Glu Ile His Glu Leu Glu Pro
435 440 445

Asn Lys Gln Ile His His Leu Gly Glu Val Val Ile His Leu Asp Gly
450 455 460

Gln Ile Leu Glu Asn Ser Arg Trp Gly Lys Phe Gly Glu Thr Gly Ile
465 470 475 480

Val Gln Ala Arg Trp Gln Gly Glu Glu Leu Val Leu Arg Gly Ile Ser
485 490 495

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Gln Arg Glu Leu Leu Lys Gln Asn Gln Ser Ser Lys Arg Pro Val Asp
            500                 505                 510

Phe Asp Cys Cys Ala Asn Cys Arg His Phe Gln His Tyr His Cys Arg
        515                 520                 525

Asn Pro Val Ser Pro Leu Met Gly Leu Glu Val Arg Ala Asp Gly His
    530                 535                 540

Cys Pro Val Phe Glu Ser Val Ala Ser Ser
545                 550
```

<210> 237
<211> 636
<212> PRT
<213> Methanobacterium thermoautotrophicum

<400> 237

```
Met Val Ser Glu Met Leu Glu Glu Ile Lys Arg Thr Ile Met Gln Arg
  1               5                  10                  15

Leu Pro Glu Arg Val Gln Val Ala Lys Val Glu Phe Glu Gly Pro Glu
            20                  25                  30

Val Val Ile Tyr Thr Lys Asn Pro Glu Ile Ile Thr Glu Asn Gly Asn
        35                  40                  45

Leu Ile Arg Asp Ile Ala Lys Asp Ile Arg Lys Arg Ile Ile Ile Arg
    50                  55                  60

Ser Asp Arg Ser Val Leu Met Asp Pro Glu Lys Ala Ile Arg Lys Ile
65                  70                  75                  80

His Glu Ile Val Pro Glu Glu Ala Lys Ile Thr Asn Ile Ser Phe Asp
                85                  90                  95

Asp Val Thr Cys Glu Val Ile Ile Glu Ala Arg Lys Pro Gly Leu Val
            100                 105                 110

Ile Gly Lys Tyr Gly Ser Thr Ser Arg Glu Ile Val Lys Asn Thr Gly
        115                 120                 125

Trp Ala Pro Lys Ile Leu Arg Thr Pro Pro Ile Ser Ser Glu Ile Ile
    130                 135                 140

Glu Arg Ile Arg Arg Thr Leu Arg Lys Asn Ser Lys Glu Arg Lys Lys
145                 150                 155                 160

Ile Leu Gln Gln Leu Gly Asn Arg Ile His Gln Lys Pro Lys Tyr Asp
                165                 170                 175

Asn Asp Trp Ala Arg Leu Thr Ala Met Gly Gly Phe Arg Glu Val Gly
            180                 185                 190

Arg Ser Cys Leu Tyr Leu Gln Thr Pro Asn Ser Arg Val Leu Leu Asp
        195                 200                 205

Cys Gly Val Asn Val Ala Gly Gly Asp Asp Lys Asn Ser Tyr Pro Tyr
    210                 215                 220

Leu Asn Val Pro Glu Phe Thr Leu Asp Ser Leu Asp Ala Val Ile Ile
225                 230                 235                 240
```

Thr His Ala His Leu Asp His Ser Gly Phe Leu Pro Tyr Leu Tyr His
245 250 255

Tyr Gly Tyr Asp Gly Pro Val Tyr Cys Thr Ala Pro Thr Arg Asp Leu
260 265 270

Met Thr Leu Leu Gln Leu Asp His Ile Asp Ile Ala His Arg Glu Asp
275 280 285

Glu Pro Leu Pro Phe Asn Val Lys His Val Lys Lys Ser Val Lys His
290 295 300

Thr Ile Thr Leu Asp Tyr Gly Glu Val Thr Asp Ile Ala Pro Asp Ile
305 310 315 320

Arg Leu Thr Leu His Asn Ala Gly His Ile Leu Gly Ser Ala Met Ala
325 330 335

His Leu His Ile Gly Asp Gly Gln His Asn Met Val Tyr Thr Gly Asp
340 345 350

Phe Lys Tyr Glu Gln Ser Arg Leu Leu Glu Ala Ala Ala Asn Arg Phe
355 360 365

Pro Arg Ile Glu Thr Leu Val Met Glu Ser Thr Tyr Gly Gly His Glu
370 375 380

Asp Val Gln Pro Ser Arg Asn Arg Ala Glu Lys Glu Leu Val Lys Thr
385 390 395 400

Ile Tyr Ser Thr Leu Arg Arg Gly Gly Lys Ile Leu Ile Pro Val Phe
405 410 415

Ala Val Gly Arg Ala Gln Glu Leu Met Ile Val Leu Glu Glu Tyr Ile
420 425 430

Arg Thr Gly Ile Ile Asp Glu Val Pro Val Tyr Ile Asp Gly Met Ile
435 440 445

Trp Glu Ala Asn Ala Ile His Thr Ala Arg Pro Glu Tyr Leu Ser Lys
450 455 460

Asp Leu Arg Asp Gln Ile Phe His Met Gly His Asn Pro Phe Ile Ser
465 470 475 480

Asp Ile Phe His Lys Val Asn Gly Met Asp Glu Arg Arg Glu Ile Val
485 490 495

Glu Gly Glu Pro Ser Ile Ile Leu Ser Thr Ser Gly Met Leu Thr Gly
500 505 510

Gly Asn Ser Leu Glu Tyr Phe Lys Trp Leu Cys Glu Asp Pro Asp Asn
515 520 525

Ser Leu Val Phe Val Gly Tyr Gln Ala Glu Gly Ser Leu Gly Arg Arg
530 535 540

Ile Gln Lys Gly Trp Lys Glu Ile Pro Leu Lys Asp Glu Asp Asp Lys
545 550 555 560

Met Arg Val Tyr Asn Val Arg Met Asn Ile Lys Thr Ile Glu Gly Phe
565 570 575

```
Ser Gly His Ser Asp Arg Arg Gln Leu Met Glu Tyr Val Lys Arg Ile
            580                 585                 590

Ser Pro Lys Pro Glu Lys Ile Leu Leu Cys His Gly Asp Asn Tyr Lys
        595                 600                 605

Thr Leu Asp Leu Ala Ser Ser Ile Tyr Arg Thr Tyr Arg Ile Glu Thr
    610                 615                 620

Lys Thr Pro Leu Asn Leu Glu Thr Val Arg Ile Gln
625                 630                 635


<210> 238
<211> 1040
<212> PRT
<213> Homo sapiens

<400> 238
Met Leu Glu Asp Ile Ser Glu Glu Asp Ile Trp Glu Tyr Lys Ser Lys
  1               5                  10                  15

Arg Lys Pro Lys Arg Val Asp Pro Asn Asn Gly Ser Lys Asn Ile Leu
            20                  25                  30

Lys Ser Val Glu Lys Ala Thr Asp Gly Lys Tyr Gln Ser Lys Arg Ser
        35                  40                  45

Arg Asn Arg Lys Arg Ala Ala Glu Ala Lys Glu Val Lys Asp His Glu
     50                  55                  60

Val Pro Leu Gly Asn Ala Gly Cys Gln Thr Ser Val Ala Ser Ser Gln
 65                  70                  75                  80

Asn Ser Ser Cys Gly Asp Gly Ile Gln Gln Thr Gln Asp Lys Glu Thr
                85                  90                  95

Thr Pro Gly Lys Leu Cys Arg Thr Gln Lys Ser Gln His Val Ser Pro
            100                 105                 110

Lys Ile Arg Pro Val Tyr Asp Gly Tyr Cys Pro Asn Cys Gln Met Pro
        115                 120                 125

Phe Ser Ser Leu Ile Gly Gln Thr Pro Arg Trp His Val Phe Glu Cys
    130                 135                 140

Leu Asp Ser Pro Pro Arg Ser Glu Thr Glu Cys Pro Asp Gly Leu Leu
145                 150                 155                 160

Cys Thr Ser Thr Ile Pro Phe His Tyr Lys Arg Tyr Thr His Phe Leu
                165                 170                 175

Leu Ala Gln Ser Arg Ala Gly Asp His Pro Phe Ser Ser Pro Ser Pro
            180                 185                 190

Ala Ser Gly Gly Ser Phe Ser Glu Thr Lys Ser Gly Val Leu Cys Ser
        195                 200                 205

Leu Glu Glu Arg Trp Ser Ser Tyr Gln Asn Gln Thr Asp Asn Ser Val
    210                 215                 220

Ser Asn Asp Pro Leu Leu Met Thr Gln Tyr Phe Lys Lys Ser Pro Ser
225                 230                 235                 240
```

Leu Thr Glu Ala Ser Glu Lys Ile Ser Thr His Ile Gln Thr Ser Gln
245 250 255

Gln Ala Leu Gln Phe Thr Asp Phe Val Glu Asn Asp Lys Leu Val Gly
260 265 270

Val Ala Leu Arg Leu Ala Asn Asn Ser Glu His Ile Asn Leu Pro Leu
275 280 285

Pro Glu Asn Asp Phe Ser Asp Cys Glu Ile Ser Tyr Ser Pro Leu Gln
290 295 300

Ser Asp Glu Asp Thr His Asp Ile Asp Glu Lys Pro Asp Asp Ser Gln
305 310 315 320

Glu Gln Leu Phe Phe Thr Glu Ser Ser Lys Asp Gly Ser Leu Glu Glu
325 330 335

Asp Asp Asp Ser Cys Gly Phe Phe Lys Lys Arg His Gly Pro Leu Leu
340 345 350

Lys Asp Gln Asp Glu Ser Cys Pro Lys Val Asn Ser Phe Leu Thr Arg
355 360 365

Asp Lys Tyr Asp Glu Gly Leu Tyr Arg Phe Asn Ser Leu Asn Asp Leu
370 375 380

Ser Gln Pro Ile Ser Gln Asn Asn Glu Ser Thr Leu Pro Tyr Asp Leu
385 390 395 400

Ala Cys Thr Gly Gly Asp Phe Val Leu Phe Pro Pro Ala Leu Ala Gly
405 410 415

Lys Leu Ala Ala Ser Val His Gln Ala Thr Lys Ala Lys Pro Asp Glu
420 425 430

Pro Glu Phe His Ser Ala Gln Ser Asn Lys Gln Lys Gln Val Ile Glu
435 440 445

Glu Ser Ser Val Tyr Asn Gln Val Ser Leu Pro Leu Val Lys Ser Leu
450 455 460

Met Leu Lys Pro Phe Glu Ser Gln Val Glu Gly Tyr Leu Ser Ser Gln
465 470 475 480

Pro Thr Gln Asn Thr Ile Arg Lys Leu Ser Ser Glu Asn Leu Asn Ala
485 490 495

Lys Asn Asn Thr Asn Ser Ala Cys Phe Cys Arg Lys Ala Leu Glu Gly
500 505 510

Val Pro Val Gly Lys Ala Thr Ile Leu Asn Thr Glu Asn Leu Ser Ser
515 520 525

Thr Pro Ala Pro Lys Tyr Leu Lys Ile Leu Pro Ser Gly Leu Lys Tyr
530 535 540

Asn Ala Arg His Pro Ser Thr Lys Val Met Lys Gln Met Asp Ile Gly
545 550 555 560

Val Tyr Phe Gly Leu Pro Pro Lys Arg Lys Glu Glu Lys Leu Leu Gly
565 570 575

Glu Ser Ala Leu Glu Gly Ile Asn Leu Asn Pro Val Pro Ser Pro Asn
580 585 590

Gln Lys Arg Ser Ser Gln Cys Lys Arg Lys Ala Glu Lys Ser Leu Ser
595 600 605

Asp Leu Glu Phe Asp Ala Ser Thr Leu His Glu Ser Gln Leu Ser Val
610 615 620

Glu Leu Ser Ser Glu Arg Ser Gln Arg Gln Lys Lys Arg Cys Arg Lys
625 630 635 640

Ser Asn Ser Leu Gln Glu Gly Ala Cys Gln Lys Arg Ser Asp His Leu
645 650 655

Ile Asn Thr Glu Ser Glu Ala Val Asn Leu Ser Lys Val Lys Val Phe
660 665 670

Thr Lys Ser Ala His Gly Gly Leu Gln Arg Gly Asn Lys Lys Ile Pro
675 680 685

Glu Ser Ser Asn Val Gly Gly Ser Arg Lys Lys Thr Cys Pro Phe Tyr
690 695 700

Lys Lys Ile Pro Gly Thr Gly Phe Thr Val Asp Ala Phe Gln Tyr Gly
705 710 715 720

Val Val Glu Gly Cys Thr Ala Tyr Phe Leu Thr His Phe His Ser Asp
725 730 735

His Tyr Ala Gly Leu Ser Lys His Phe Thr Phe Pro Val Tyr Cys Ser
740 745 750

Glu Ile Thr Gly Asn Leu Leu Lys Asn Lys Leu His Val Gln Glu Gln
755 760 765

Tyr Ile His Pro Leu Pro Leu Asp Thr Glu Cys Ile Val Asn Gly Val
770 775 780

Lys Val Val Leu Leu Asp Ala Asn His Cys Pro Gly Ala Val Met Ile
785 790 795 800

Leu Phe Tyr Leu Pro Asn Gly Thr Val Ile Leu His Thr Gly Asp Phe
805 810 815

Arg Ala Asp Pro Ser Met Glu Arg Ser Leu Leu Ala Asp Gln Lys Val
820 825 830

His Met Leu Tyr Leu Asp Thr Thr Tyr Cys Ser Pro Glu Tyr Thr Phe
835 840 845

Pro Ser Gln Gln Glu Val Ile Arg Phe Ala Ile Asn Thr Ala Phe Glu
850 855 860

Ala Val Thr Leu Asn Pro His Ala Leu Val Val Cys Gly Thr Tyr Ser
865 870 875 880

Ile Gly Lys Glu Lys Val Phe Leu Ala Ile Ala Asp Val Leu Gly Ser
885 890 895

Lys Val Gly Met Ser Gln Glu Lys Tyr Lys Thr Leu Gln Cys Leu Asn
900 905 910

```
Ile Pro Glu Ile Asn Ser Leu Ile Thr Thr Asp Met Cys Ser Ser Leu
        915                 920                 925

Val His Leu Leu Pro Met Met Gln Ile Asn Phe Lys Gly Leu Gln Ser
    930                 935                 940

His Leu Lys Lys Cys Gly Gly Lys Tyr Asn Gln Ile Leu Ala Phe Arg
945                 950                 955                 960

Pro Thr Gly Trp Thr His Ser Asn Lys Phe Thr Arg Ile Ala Asp Val
                965                 970                 975

Ile Pro Gln Thr Lys Gly Asn Ile Ser Ile Tyr Gly Ile Pro Tyr Ser
            980                 985                 990

Glu His Ser Ser Tyr Leu Glu Met Lys Arg Phe Val Gln Trp Leu Lys
        995                1000                1005

Pro Gln Lys Ile Ile Pro Thr Val Asn Val Gly Thr Trp Lys Ser Arg
   1010                1015                1020

Ser Thr Met Glu Lys Tyr Phe Arg Glu Trp Lys Leu Glu Ala Gly Tyr
1025                1030                1035                1040
```


<210> 239
<211> 723
<212> PRT
<213> Arabidopsis thaliana

<400> 239

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Met Ser Asn Thr Val Glu Asp Asp Asp Asp Asp Phe Gln Ile Pro Pro
  1               5                  10                  15

Ser Ser Gln Leu Ser Ile Arg Lys Pro Leu His Pro Thr Asn Ala Asn
            20                  25                  30

Asn Ile Ser His Arg Pro Pro Asn Lys Lys Pro Arg Leu Cys Arg Tyr
        35                  40                  45

Pro Gly Lys Glu Asn Val Thr Pro Pro Pro Ser Pro Asp Pro Asp Leu
    50                  55                  60

Phe Cys Ser Ser Ser Thr Pro His Cys Ile Leu Asp Cys Ile Pro Ser
65                  70                  75                  80

Ser Val Asp Cys Ser Leu Gly Asp Phe Asn Gly Pro Ile Ser Ser Leu
                85                  90                  95

Gly Glu Glu Asp Lys Glu Asp Lys Asp Asp Cys Ile Lys Val Asn Arg
            100                 105                 110

Glu Gly Tyr Leu Cys Asn Ser Met Glu Ala Arg Leu Leu Lys Ser Arg
        115                 120                 125

Ile Cys Leu Gly Phe Asp Ser Gly Ile His Glu Asp Asp Glu Gly Phe
    130                 135                 140

Val Glu Ser Asn Ser Glu Leu Asp Val Leu Ile Asn Leu Cys Ser Glu
145                 150                 155                 160
```

Ser Glu Gly Arg Ser Gly Glu Phe Ser Leu Gly Lys Asp Asp Ser Ile
165 170 175

Gln Cys Pro Leu Cys Ser Met Asp Ile Ser Ser Leu Ser Glu Glu Gln
180 185 190

Arg Gln Val His Ser Asn Thr Cys Leu Asp Lys Ser Tyr Asn Gln Pro
195 200 205

Ser Glu Gln Asp Ser Leu Arg Lys Cys Glu Asn Leu Ser Ser Leu Ile
210 215 220

Lys Glu Ser Ile Asp Asp Pro Val Gln Leu Pro Gln Leu Val Thr Asp
225 230 235 240

Leu Ser Pro Val Leu Lys Trp Leu Arg Ser Leu Gly Leu Ala Lys Tyr
245 250 255

Glu Asp Val Phe Ile Arg Glu Glu Ile Asp Trp Asp Thr Leu Gln Ser
260 265 270

Leu Thr Glu Glu Asp Leu Leu Ser Ile Gly Ile Thr Ser Leu Gly Pro
275 280 285

Arg Lys Lys Ile Val Asn Ala Leu Ser Gly Val Arg Asp Pro Phe Ala
290 295 300

Ser Ser Ala Glu Val Gln Ala Gln Ser His Cys Thr Ser Gly His Val
305 310 315 320

Thr Glu Arg Gln Arg Asp Lys Ser Thr Thr Arg Lys Ala Ser Glu Pro
325 330 335

Lys Lys Pro Thr Ala Asn Lys Leu Ile Thr Glu Phe Phe Pro Gly Gln
340 345 350

Ala Thr Glu Gly Thr Lys Ile Arg Thr Ala Pro Lys Pro Val Ala Glu
355 360 365

Lys Ser Pro Ser Asp Ser Ser Ser Arg Arg Ala Val Arg Arg Asn Gly
370 375 380

Asn Asn Gly Lys Ser Lys Val Ile Pro His Trp Asn Cys Ile Pro Gly
385 390 395 400

Thr Pro Phe Arg Val Asp Ala Phe Lys Tyr Leu Thr Arg Asp Cys Cys
405 410 415

His Trp Phe Leu Thr His Phe His Leu Asp His Tyr Gln Gly Leu Thr
420 425 430

Lys Ser Phe Ser His Gly Lys Ile Tyr Cys Ser Leu Val Thr Ala Lys
435 440 445

Leu Val Asn Met Lys Ile Gly Ile Pro Trp Glu Arg Leu Gln Val Leu
450 455 460

Asp Leu Gly Gln Lys Val Asn Ile Ser Gly Ile Asp Val Thr Cys Phe
465 470 475 480

Asp Ala Asn His Cys Pro Gly Ser Ile Met Ile Leu Phe Glu Pro Ala
485 490 495

```
Asn Gly Lys Ala Val Leu His Thr Gly Asp Phe Arg Tyr Ser Glu Glu
            500                 505                 510

Met Ser Asn Trp Leu Ile Gly Ser His Ile Ser Ser Leu Ile Leu Asp
        515                 520                 525

Thr Thr Tyr Cys Asn Pro Gln Tyr Asp Phe Pro Lys Gln Glu Ala Val
    530                 535                 540

Ile Gln Phe Val Val Glu Ala Ile Gln Ala Glu Ala Phe Asn Pro Lys
545                 550                 555                 560

Thr Leu Phe Leu Ile Gly Ser Tyr Thr Ile Gly Lys Glu Arg Leu Phe
                565                 570                 575

Leu Glu Val Ala Arg Val Leu Arg Glu Lys Ile Tyr Ile Asn Pro Ala
            580                 585                 590

Lys Leu Lys Leu Leu Glu Cys Leu Gly Phe Ser Lys Asp Asp Ile Gln
        595                 600                 605

Trp Phe Thr Val Lys Glu Glu Glu Ser His Ile His Val Val Pro Leu
    610                 615                 620

Trp Thr Leu Ala Ser Phe Lys Arg Leu Lys His Val Ala Asn Arg Tyr
625                 630                 635                 640

Thr Asn Arg Tyr Ser Leu Ile Val Ala Phe Ser Pro Thr Gly Trp Thr
                645                 650                 655

Ser Gly Lys Thr Lys Lys Lys Ser Pro Gly Arg Arg Leu Gln Gln Gly
            660                 665                 670

Thr Ile Ile Arg Tyr Glu Val Pro Tyr Ser Glu His Ser Ser Phe Thr
        675                 680                 685

Glu Leu Lys Glu Phe Val Gln Lys Val Ser Pro Glu Val Ile Ile Pro
    690                 695                 700

Ser Val Asn Asn Asp Gly Pro Asp Ser Ala Ala Ala Met Val Ser Leu
705                 710                 715                 720

Leu Val Thr
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<210> 240
<211> 661
<212> PRT
<213> Saccharomyces cerevisiae

<400> 240

```
Met Ser Arg Lys Ser Ile Val Gln Ile Arg Arg Ser Glu Val Lys Arg
  1               5                  10                  15

Lys Arg Ser Ser Thr Ala Ser Ser Thr Ser Glu Gly Lys Thr Leu His
            20                  25                  30

Lys Asn Thr His Thr Ser Ser Lys Arg Gln Arg Thr Leu Thr Glu Phe
        35                  40                  45

Asn Ile Pro Thr Ser Ser Asn Leu Pro Val Arg Ser Ser Ser Tyr Ser
    50                  55                  60
```

Phe Ser Arg Phe Ser Cys Ser Thr Ser Asn Lys Asn Thr Glu Pro Val
65 70 75 80

Ile Ile Asn Asp Asp Asp His Asn Ser Ile Cys Leu Glu Asp Thr Ala
85 90 95

Lys Val Glu Ile Thr Ile Asp Thr Asp Glu Glu Glu Leu Val Ser Leu
100 105 110

His Asp Asn Glu Val Ser Ala Ile Glu Asn Arg Thr Glu Asp Arg Ile
115 120 125

Val Thr Glu Leu Glu Glu Gln Val Asn Val Lys Val Ser Thr Glu Val
130 135 140

Ile Gln Cys Pro Ile Cys Leu Glu Asn Leu Ser His Leu Glu Leu Tyr
145 150 155 160

Glu Arg Glu Thr His Cys Asp Thr Cys Ile Gly Ser Asp Pro Ser Asn
165 170 175

Met Gly Thr Pro Lys Lys Asn Ile Arg Ser Phe Ile Ser Asn Pro Ser
180 185 190

Ser Pro Ala Lys Thr Lys Arg Asp Ile Ala Thr Ser Lys Lys Pro Thr
195 200 205

Arg Val Lys Leu Val Leu Pro Ser Phe Lys Ile Ile Lys Phe Asn Asn
210 215 220

Gly His Glu Ile Val Val Asp Gly Phe Asn Tyr Lys Ala Ser Glu Thr
225 230 235 240

Ile Ser Gln Tyr Phe Leu Ser His Phe His Ser Asp His Tyr Ile Gly
245 250 255

Leu Lys Lys Ser Trp Asn Asn Pro Asp Glu Asn Pro Ile Lys Lys Thr
260 265 270

Leu Tyr Cys Ser Lys Ile Thr Ala Ile Leu Val Asn Leu Lys Phe Lys
275 280 285

Ile Pro Met Asp Glu Ile Gln Ile Leu Pro Met Asn Lys Arg Phe Trp
290 295 300

Ile Thr Asp Thr Ile Ser Val Val Thr Leu Asp Ala Asn His Cys Pro
305 310 315 320

Gly Ala Ile Ile Met Leu Phe Gln Glu Phe Leu Ala Asn Ser Tyr Asp
325 330 335

Lys Pro Ile Arg Gln Ile Leu His Thr Gly Asp Phe Arg Ser Asn Ala
340 345 350

Lys Met Ile Glu Thr Ile Gln Lys Trp Leu Ala Glu Thr Ala Asn Glu
355 360 365

Thr Ile Asp Gln Val Tyr Leu Asp Thr Thr Tyr Met Thr Met Gly Tyr
370 375 380

Asn Phe Pro Ser Gln His Ser Val Cys Glu Thr Val Ala Asp Phe Thr
385 390 395 400

```
Leu Arg Leu Ile Lys His Gly Lys Asn Lys Thr Phe Gly Asp Ser Gln
                405                 410                 415

Arg Asn Leu Phe His Phe Gln Arg Lys Lys Thr Leu Thr Thr His Arg
            420                 425                 430

Tyr Arg Val Leu Phe Leu Val Gly Thr Tyr Thr Ile Gly Lys Glu Lys
        435                 440                 445

Leu Ala Ile Lys Ile Cys Glu Phe Leu Lys Thr Lys Leu Phe Val Met
    450                 455                 460

Pro Asn Ser Val Lys Phe Ser Met Met Leu Thr Val Leu Gln Asn Asn
465                 470                 475                 480

Glu Asn Gln Asn Asp Met Trp Asp Glu Ser Leu Leu Thr Ser Asn Leu
                485                 490                 495

His Glu Ser Ser Val His Leu Val Pro Ile Arg Val Leu Lys Ser Gln
            500                 505                 510

Glu Thr Ile Glu Ala Tyr Leu Lys Ser Leu Lys Glu Leu Glu Thr Asp
        515                 520                 525

Tyr Val Lys Asp Ile Glu Asp Val Val Gly Phe Ile Pro Thr Gly Trp
    530                 535                 540

Ser His Asn Phe Gly Leu Lys Tyr Gln Lys Lys Asn Asp Asp Asp Glu
545                 550                 555                 560

Asn Glu Met Ser Gly Asn Thr Glu Tyr Cys Leu Glu Leu Met Lys Asn
                565                 570                 575

Asp Arg Asp Asn Asp Asp Glu Asn Gly Phe Glu Ile Ser Ser Ile Leu
            580                 585                 590

Arg Gln Tyr Lys Lys Tyr Asn Lys Phe Gln Val Phe Asn Val Pro Tyr
        595                 600                 605

Ser Glu His Ser Ser Phe Asn Asp Leu Val Lys Phe Gly Cys Lys Leu
    610                 615                 620

Lys Cys Ser Glu Val Ile Pro Thr Val Asn Leu Asn Asn Leu Trp Lys
625                 630                 635                 640

Val Arg Tyr Met Thr Asn Trp Phe Gln Cys Trp Glu Asn Val Arg Lys
                645                 650                 655

Thr Arg Ala Ala Lys
            660
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